

THIRD REPORT
ON THE
NOXIOUS AND OTHER INSECTS
OF THE
STATE OF NEW-YORK.

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Executive Committee New-York State Agricultural Society:

In presenting this, my third Report, I would observe that the researches in which, pursuant to your instructions, I am occupied, embrace a field of vast extent. These researches, for the present, have a particular reference to those insects which are injurious—the branch of science which is termed Economical Entomology. They thus include a consideration of all those insects which are detrimental,

1. To fruit trees.
2. To forest trees.
3. To the grass crop of meadows and pastures.
4. To grain and other field crops.
5. To the kitchen garden.
6. To the flower garden and greenhouse.
7. To domestic animals.
8. To man, molesting (1.) his person, (2) his household property; such as furniture, clothing, stored provisions, &c.

These several heads will, I believe, embrace every object which legitimately pertains to this branch of science; and this, in my apprehension, is the most simple and appropriate division, the

best classification of its subjects which can be made. And when we call to mind how many insect depredators are to be found upon a particular kind of tree, or a single one of our grain crops, it will at once be perceived that the number of objects to be examined under all of the several heads above specified, will be truly immense. Many years will of course be required to investigate each one of these sufficiently to render such a full and exact account of it as the advanced state of knowledge at the present day demands—an account which will give to the reader a complete view of the history and economy of each species—such an acquaintance with them, in short, as is requisite to enable those who are suffering from these pests to devise the most suitable and effectual modes for combatting them.

In the meantime, as the habits of a multitude of these depredators have already been investigated more or less fully by different observers, it is important that the information relating to them, which is now scattered through a number of different works, many of which are inaccessible to those who are most deeply interested in the premises, should be brought together in a condensed form, so as to present a full view of this subject. More than a century ago, the celebrated naturalist Reaumur, expressed the wish that those observers who are laboring to elucidate the history of insects, would prepare and give to the world lists of all the kinds which feed upon each particular tree and plant. But in this country, where so little accurate knowledge of our insects is diffused among the population, in addition to its name, an indication of the external appearance and habits of each species is a great desideratum. Our agricultural periodicals are making frequent allusion to this as a most important want at the present time. And I have hence thought that, in addition to the original matter which I have to report as the fruit of my own investigations, I could not render a more valuable service than that of posting up this subject in such a manner as to present a map as it were of the entire field. I therefore propose, in this and the succeeding reports, to pass over this whole ground, giving every American insect which is at present known as being an injurious species, arranging them in their regular order under the several heads above specified. I design to give the common and the scientific name of each species, with the name of the order and family to

which it pertains, followed by a brief statement of (1st) the particular injury which each species does and the time of the year when it commits its depredations, (2d,) the appearance of the depredator, and if it be a worm or larva, add to this (3d) where it secretes itself to repose during its pupa state, and (4th) the appearance which it finally assumes when it comes out in its perfect form; and if it be a species the history of which has already been published, give (lastly,) a reference to the work where the most particular account of it and the remedies for opposing it will be found. I endeavor in each instance to render this account as succinct as possible, and at the same time sufficiently plain and definite to enable any one, when he meets with an injurious insect, to ascertain its name. As it is the leading design of these Reports to impart information to common readers, I aim to use such terms and give such comparisons as will make the subject most clear to their comprehension, even at the risk in some instances of appearing inelegant and uncouth.

Many insects, it is well known, feed upon several different kinds of vegetation. The account of these is introduced under the particular tree or plant to which each appears to be most attached and on which it occurs in the greatest abundance, and under each of the other trees or plants on which it is known to feed, its name only is given, with a reference to the place where the description of it will be found, the species being numbered in a continuous series to facilitate such references. A large portion of the insects which now infest our fruit trees, originally subsisted upon the native forest trees of this country, and many of these still occur in their original haunts in greater numbers than in the new situations to which circumstances have obliged them to resort. But as such insects will be much more frequently noticed upon fruit trees, and are more important to us in consequence of the depredations they are liable to commit upon the trees of this class, I place the description of them under this head. The present Report thus completes the account of all the insects at present known to infest our fruit trees, both cultivated and wild, the latter embracing the chestnut, hickory, butternut and hazelnut, which I class as fruit rather than forest trees, for the reason that they are more valued through our country generally, in consequence of the fruit

which they yield, than for the timber and fuel which we obtain from them.

Many things which are most interesting and remarkable are brought to my view, in the researches in which I am occupied, and I sometimes think there is no kind of mischief going on in the world of nature around us but that some insect is at the bottom of it. Certain it is that these little creatures, seemingly so insignificant and powerless as to be unworthy of a moment's notice from any body but the curious, occupy a most important rank in the scale of creation, and on every side of us their performances are producing most important results, tending probably in an equal degree to our benefit in one direction as to our detriment in another. We are accustomed to read with wonder the accounts which authors give of the singular habits and amazing achievements of these creatures in foreign lands, little suspecting that in the fields and woods around our own dwellings, operations are constantly going on which are every whit as interesting and marvellous. Since my last Report was presented, I have succeeded in completing the history of an insect whose deeds are as astonishing as anything on record in the annals of science. It is well known that certain insects have been created apparently for the sole purpose of preying upon other insects, and thus restraining them from becoming excessively multiplied. But I am not aware of any discovery hitherto made indicating it to be the office of any creature of this class to check the undue increase of any of the higher orders of animals. The fact has long been known of the squirrels of this country that the males are very frequently emasculated, but how this deformity is produced has all along been involved in doubt, it being the current popular supposition that some of these animals seize and overpower their unfortunate fellows and with their sharp teeth reduce them to the condition of eunuchs. But I am now prepared to report a fact which will probably set this mooted point to rest. I find we have a species of fly, analogous to the bot fly of the horse and the gad fly which produces the warbles in the backs of cattle, the grub of which resides in the scrotum of the squirrel and consumes its testicles. How surprising that an insect should have been called into existence for the express purpose of executing such a singular work as this!

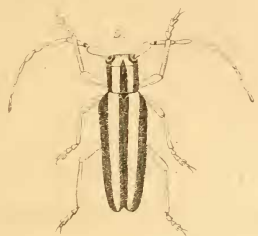
And in connexion with the investigations which I am pursuing other facts similarly valuable as shedding additional light upon this branch of the natural history of our country are frequently elicited, which, however, have no relation to the subject of noxious insects. I have therefore appended a few supplementary pages to the present report, in which the more important items of this extraneous matter is presented. Respectfully submitted,

ASA FITCH.





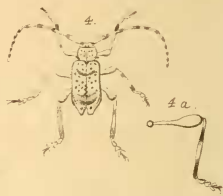
Apple Aphis male.



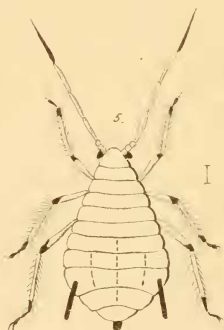
Apple tree borer



Apple Buprestis



Prickly Leptostylus.



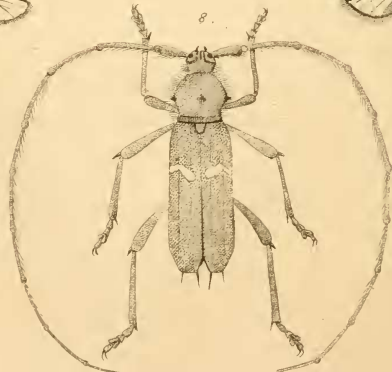
Apple Aphis, female.



Peach borer, male



Peach borer, female.



Belted long horn

INSECTS INFESTING FRUIT TREES.

THE APPLE.—*Pyrus Malus*.

AFFECTING THE ROOT.

1. APPLEROOT BLIGHT, *Pemphigus Pyri*, Fitch. (Homoptera. Aphidæ.)

Wart-like excrescences growing upon the roots, sometimes of an enormous size; containing in their crevices exceedingly minute pale yellow lice, often accompanied with larger winged ones, having their bodies covered with a white cotton-like matter.

The mature, winged insect, a black fly with a dull greenish abdomen and the wings transparent but not clear and glass-like, with a faint smokiness at their tips, in the cell or space inclosed by the last of the four oblique veins. Length to the end of the wings nearly or quite a quarter of an inch, (0.25.) See Transactions of the New-York State Agricultural Society, 1854, page 709.

AFFECTING THE TRUNK.

Worms beneath the bark, mining cavities in the outer sap wood and boring holes in the heart wood.

These are the most pernicious enemies which the apple tree has, whole orchards of young trees, if neglected, being almost sure, of late years, to become suddenly infested and destroyed by one or more of these insects.

2. APPLE TREE BORER, *Saperda bivittata*, Say. (Coleoptera. Cerambycidae.) [Plate I, fig. 2.]

A large cylindrical white footless grub, rather broadest anteriorly, its head chestnut brown, its mouth black. Excavating

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irregular roundish or long and narrowish flat shallow burrows, immediately under the bark, at the crown of the root, where the worm lies through the first winter; then boring upwards in the solid wood about three inches, and reposing here through the second winter, the perfect insect coming out of the tree the following June.

A cylindrical butternut-brown beetle, hoary white beneath, and with two broad milk white stripes above, running the whole length of its body. Length 0.60 to 0.75.

A full account of this species will be found in my first report, Transactions N. Y. State Agricultural Society for 1854, p. 715. Having recently enjoyed ample opportunities for inspecting the work of this borer, I find it is more variable in its habits than previous information had led me to suppose. The account given by Dr. Harris, the best authority we have hitherto possessed on subjects of this kind, has caused a very imperfect and in some respects erroneous idea of its operations to become widely prevalent in our country. He says, "The grub, with its strong jaws, cuts a cylindrical passage through the bark, and pushes its castings backwards out of the hole from time to time, while it bores upwards in the wood, penetrating eight or ten inches in the tree." But, as I have heretofore stated, it is when the worm first hatches from the egg that it mines its way through the bark, and is then so minute that the hole it makes is no larger than the perforation of a pin, and often becomes wholly closed and obliterated. And the worm does not now penetrate into the wood, but feeds upon the inner layers of the bark and the outer layers of the sap-wood, for about a twelvemonth, and till it is half grown to maturity, excavating hereby a shallow flat cavity between the bark and the wood, which cavity extends some two or three inches up and down and is half as broad, but is commonly very irregular in its form, in consequence of several worms working in the same tree and avoiding any encroachment upon each other. This cavity is almost invariably found stuffed full and densely packed with the sawdust-like castings or chips of the worm, a small quantity of which is commonly protruded to the outside of the bark, sometimes through a natural crack formed by the bark becoming dead, dry and con-

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tracted, sometimes through one or more small orifices which appear to be gnawed by the worm. But I have met with many instances where none of this powder was protruded, the blackened and slightly depressed surface of the bark being the only indication of the mischief that was going on beneath. And not unfrequently the worm eats downwards, under the bark of the root, to a distance of two to four inches below the surface of the ground, instead of being always at or slightly above the surface, as previous accounts have implied. And it is of course impossible for any castings to be protruded from this part of its burrow, as the soil is firmly pressed against and moulded to the root. And where this powder appears externally, it commonly has the aspect not of having been thrust out by the worm, but of having crowded itself out, from the mass under the bark swelling by being dampened by rain soaking through the dead bark and saturating it.

The worm is almost always found at some part of the outer edge of its burrow, where it is lying apparently dormant, crowded and tightly wedged between the bark and the wood. Like most other larvæ, this moults, and its cast skin will sometimes be found among the dust in the burrow. At length, in the course of the second summer, when it has grown to half or three-quarters of an inch in length and its jaws have become sufficiently strong for the work, it begins to bore a cylindrical passage upward in the solid wood, making hereby a secure retreat, in the interior of the tree, in which to lie and sleep during its pupa state. It is not till just the close of the larva period of its life that it completes this cylindrical burrow by extending it onwards and obliquely outwards to the bark. It then stuffs the upper end of this passage with sawdust-like powder, and its lower end with short fibres of wood arranged like curly locks of hair, thus forming an elastic bed on which to repose during its pupa state. After it has changed from its pupa to its perfect form, it still remains dormant and motionless in its cell, sometimes for several weeks. Awaking at length to life and activity, it crawls upward, loosening and pulling down the dust and chips from the upper end of its burrow, till it reaches the bark. Through this it cuts a remarkably

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smooth round hole, of the exact size requisite to enable it to crawl out from the tree. This hole is commonly only four or six inches above the surface of the ground. And sometimes a worm will be met with boring its cylindrical burrow in the wood of the root, in a situation where it is evident it intends to pass its pupa state under the ground and emerge below or at the surface.

Although this borer is a native insect which has always existed upon this continent, it appears to be recently that it has taken up its residence in the apple tree. Aged persons inform me that no insect except the caterpillar was formerly known to infest this tree; and it is quite certain that our predecessors, fifty and a hundred years ago, with the little attention they were accustomed to bestow upon their orchards, could not have had such thrifty, large, long lived trees as we know were common at that time, if this and other insects attacked them then as they do now. We have met with no record, pointing this out as a depredator, until the year 1824, when Mr. Say, describing this species, notes that "In the larva state it is very injurious to the apple tree, boring into the wood." And the following spring its character appears to have become known in the vicinity of Albany for the first time. The reminiscence is one of too much interest in the history of this insect to be permitted to pass into oblivion. April 27th, 1825, the late Philip Heartt of Troy, in a letter to Jesse Buel, states that an orchard of young trees which he would not have parted with for two thousand dollars, he had just discovered were all girdled and destroyed, or very nearly so, by worms under the bark, of all sizes, from that of a large yellow grub, downward. Some of these insects at that early season were found in their perfect state, from which Dr. James Eights, Jr. ascertained them to be the species which Mr. Say had recently named and described. Judge Buel hereupon wrote to Mr. Say, soliciting further information and a remedy, who replied, recommending a measure which had then lately been found successful against the peach root borer, namely, placing common mortar around the root of the tree. This correspondence is published in full in the Memoirs of the New-York Board of Agriculture, vol. iii, commencing on page 478; and from it some facts may be gathered respecting the habits of

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this insect, which have not been stated in any of the accounts since published.

Remedies.—To repel the beetle from depositing its eggs upon the bark, the tree should be rubbed with soft soap or some other alkaline preparation, the latter part of May. Although the insect has been found changed from its pupa to its perfect form in April, I suppose such individuals would remain dormant in their cells until the season became more advanced and warm; and we have no knowledge of its appearing abroad until the beginning of June. We are yet in want of exact observations as to the date of its depositing its eggs. If preventive measures have been neglected and these worms have established themselves at the root of the tree, they should immediately be ferreted out and destroyed. This can be done much more easily when they are young and small, as they are then lying directly under the bark. Young trees should therefore be inspected every autumn or early in the spring; and if any particles of powder, like new sawdust, are found upon the ground around the root, the dead blackish bark at that point, and at other places where such bark occurs, should be cut away, until the worm beneath is discovered. A little experience will render one expert in detecting the lurking places of these pests. And they should never be allowed to remain until the second summer, to finish their injury by boring in the solid wood of the tree.

3. APPLE BUPRESTIS, *Chrysobothris femorata*, Fabricius. (Coleoptera Buprestidæ.)
[Plate I, fig 3.]

A pale yellow footless grub, its anterior end enormously large, round and flattened. Excavating a cavity under the bark and in the solid wood analogous to that of the preceding species, but much smaller.

The insect a flattish oblong, shining black beetle, its under side appearing like burnished copper, its wing covers with three raised lines, the outer two interrupted by two impressed spots. Length 0.50. Basking in the sunshine, upon apple trees, in June and July. See Trans. N. Y. State Agricultural Society, 1854, p. 729.

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4. PRICKLY LEPTOSTYLUS, *Leptostylus aculiferus*, Say. (Coleoptera. Cerambycidæ.)
[Plate I, fig. 4.]

Small worms, similar in appearance to young apple tree borers, occurring sometimes in multitudes under the bark, forming long, narrow winding tracks upon the outer surface of the wood, these tracks becoming broader as the worm has increased in size.

A rather short and thick brownish gray beetle, with small prickle-like points upon its wing covers, and back of their middle a white curved or V-shaped band, with a black streak on its hind edge. Length, 0.35. Appearing the last of August. See Country Gentleman, vol. ix, p. 78.

The wood of the apple tree was formerly highly valued for cabinet work in this country. In 1786, a son of Gen. Israel Putnam, residing in Williamstown, Mass., had a table made from one of his apple trees. Many years afterwards the gnawing of an insect was heard in one of the leaves of this table, which noise continued for a year or two, when a large long-horned beetle made its exit therefrom. Subsequently the same noise was heard again, and another insect, and afterwards a third, all of the same kind, issued from this table leaf—the first one coming out twenty and the last one twenty-eight years after the tree was cut down. These facts are more fully stated in the history of the county of Berkshire, published at Pittsfield, 1829, page 39. This, I believe, is the longest period of an insect remaining alive in timber, of which we have any record, and it is important to ascertain, if possible, what insect this was. John J. Putnam, Esq., of Whitecreek, N. Y., was a young man, residing at his father's in Williamstown, when these remarkable incidents occurred. On showing to him specimens of all the larger long-horned beetles of this vicinity, he points to the *Cerasphorus balteatus* (plate I, fig. 8; see insects infesting the trunk of the hickory,) as being the same insect, according to the best of his recollection, though he is not certain but it might have been the *Callidium agreste*. This testimony, in connection with what President Fitch of Williams college says of the insect in the notice above referred to, "its color dark glistening brown with tints of yellow," releases us from all doubts upon this subject, as the *agreste* is of a uniform brown color, whilst the *balteatus* commonly presents traces more or less distinct of an oblique yellowish spot or band near the middle of its wing covers. We may therefore regard the *balteatus* as another insect which occasionally bores in the trunks of the apple tree.

5. APPLE BARK BEETLE, *Tomicus Mali*, new sp. (Coleoptera. Scolytidæ.)

Young thrifty trees, soon after putting forth their leaves in spring, suddenly withering, as though scorched by fire, the bark becoming loosened from the wood, and soon after numerous per-

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forations like pin holes appearing, penetrating through the bark and into the wood, from each of which comes out a very small, cylindrical beetle, which is smooth, slender, black, sometimes dark chestnut red, its legs and antennæ testaceous or dull pale yellowish, its thorax anteriorly minutely punctured, the declivity at the tip of the wing-covers less abrupt than usual, with an excavation or groove along the suture, which gives the apex a notched appearance, and near the middle of the declivity upon each side of this groove a slightly elevated tubercle of the shape of a crescent, with its concave side towards the suture. Length 0.09.

I only know this insect from specimens recently sent me from Middlefield, Mass., by Lawrence Smith, Esq., who writes me that he took them July 6th, from the trunk of an apple tree ten inches in diameter, which was numerously punctured from the surface of the ground to where the limbs commenced branching off, above which no traces of them were to be found. In another letter he states that this insect was first noticed in his neighborhood two years ago, when several nursery trees were riddled by them. Nothing was seen of them last year; but they have reappeared the spring of the present year (1857) in greater abundance, and a number of trees have been ruined by them. I find a specimen of this same insect also in a collection sent me several years since from Ohio, by Dr. Robert H. Mack, of Parma.

The joints of the feet and the contour of the antennæ is the same in this insect as in the genus *Tomicus*; but between the second joint of the antennæ and the knob or club is a mere cylindrical pedicel to the knob, scarcely as long as the second joint and less than half its diameter, destitute of articulations cutting it up into small joints. The antennæ are thus but five jointed, the knob being composed of only three nearly equal joints. And I find no genus defined, the antennæ of which strictly coincide with those of this species.

PEAR BLIGHT BEETLE, *Scolytus Pyri*. See Pear insects, No. 56.

Several individuals of this species were also found by Mr. Smith, associated with the foregoing, and coming out from the bark a few days before them, making a perforation twice as large, the holes of that species being but three-hundredths of an inch in

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diameter, whilst those of this insect measure 0.06. A specimen of the wood sent me, shows a perforation made by this larger insect, running in a straight line through the bark and into the wood three-fourths of an inch, with three lateral galleries of the same size branching off from this at right angles upon one side, and one upon the opposite side, these galleries being excavated up and down parallel with the grain of the wood.

It thus appears that the pear blight beetle, instead of being limited to the twigs in its operations, as has heretofore been supposed, attacks the trunk of the tree also. And it is therefore evident that there are two generations of this insect each year. The new shoots at the ends of the limbs are not sufficiently grown to accommodate the earliest brood, and they are therefore nurtured in the trunk of the tree. When these reach maturity, the newly grown twigs offer them a more dainty repast, and they accordingly resort to them, blighting and destroying them in the manner hereafter stated in the account of this insect, No. 56.

It was formerly supposed that the bark beetles only infested trees which were already dying or dead. But more recent observations have shown that sound healthy trees are attacked and killed by them. And these observations are fully confirmed by Mr. Smith, who states that it is young thrifty apple trees, that made a most vigorous growth last summer, which have been killed this past spring by these insects.

Worms consuming the wood of old and hollow trees, hastening their decay.

The larvæ of quite a number of beetles feed upon the old and decaying wood of almost all our trees, showing little preference for one tree over another. Those only which from their very large size will be liable to attract notice when found as they frequently are in the interior of aged apple trees, may here be specified, although they are equally common in oaks, willows, &c.

6. HORN-BUG, *Lucanus Capreolus*, Linnæus. (Coleoptera. Lucanidæ.)

Large thick nearly cylindrical white worms, with the hind part of their bodies curved downwards and forwards, their heads and six legs tawny reddish, the mouth darker. In the loose dirt which accumulates in the hollow of the tree, forming large hard

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brown pods, resembling eggs, in which to lie during their pupa state.

The insect, a large oblong beetle, smooth and shining, of a chestnut or mahogany color, the males with stout sickle-shaped jaws as long as the head, and having a small tooth on their inner edge near the middle. Length 1.00 to 1.20. Often flies in at open windows, in warm evenings in July. See Harris's Treatise, p. 40.

7. ROUGH OSMODERMA, *Osmoderma scabra*, Beauvois. (Coleoptera Melolonthidæ.)

A worm similar in size and shape to the preceding, but much more rough and wrinkled transversely, changing to a broad oval black beetle, coarsely punctured, flattened upon its wing covers, which are rough from irregular elevations and have impressed lines along the middle; the males smaller, purplish black and slightly coppery, with the head flat and its edges turned upward. Length 0.80 to 1.10. Appears in July. See Harris, p. 37.

8. SMOOTH OSMODERMA, *Osmoderma eremicola*. Knoch.

This doubtless has the same form and habits with the preceding though it has not yet been observed in its larva state. The beetle is also similar in size and form, but is perfectly smooth, shining and of a deep mahogany brown color, the males having a broad transverse excavation on the fore part of the thorax. See Harris, p. 38.

9. BIG-EYED SNAPPING BEETLE, *Alaus oculatus*, Linnæus. (Coleoptera Elateridæ.)

A smooth flattened tawny yellow worm, dark brown or black at each end, growing to two and a half inches in length by 0.40 in width, rather broadest in the middle, the last segment with two thorn-like points curving upward, and on its under side a large, soft retractile pro-leg, with six small slender legs anteriorly; changing to a long, rather flat black snapping beetle, with its wing covers speckled with white, and on its thorax two large eye-like spots of coal black, surrounded by a white ring. Length 1.00 to 1.80. Occurs in June and July. See Harris, p. 48.

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Two other New-York species, very similar to this and doubtless having the same habits, may here be noticed. They are much less common, and are met with in the month of April.

10. PURBLIND SNAPPING BEETLE, *Alaus myops*, Fab.

Brown, clouded with ash-gray, the eye-like spots much smaller, dim, and oval instead of round.

11. BLINKING SNAPPING BEETLE, *Alaus luscus*, Fab.

Differs from the foregoing only in being wholly destitute of any gray or white coloring.

The DIVARICATED BUPRESTIS (see No. 71,) is sometimes met with upon decaying apple trees.

AFFECTING THE LIMBS AND TWIGS.

Mining the twigs internally causing them to perish.

12. APPLE TWIG BORER, *Bostrichus bicaudatus*, Say. (Coleoptera Bostrichidæ.)

Particular twigs withering and their leaves turning brown in midsummer, with a hole the size of a knitting needle perforated at one of the buds some six or twelve inches below the tip end of the twig, this hole running into the heart of the twig, which is consumed some inches in length.

The insect, a small cylindrical beetle, dark chesnut brown, black beneath, the fore part of its thorax rough from minute elevated points, and in the males furnished with two little horns, and the tips of their wing covers above, with two prickle-like points which curve inwards. Length 0.25 to 0.35.

This insect occurs from Pennsylvania to Mississippi, and has been common of late years in the orchards of Michigan and Illinois, but has never been met with as yet in New-York or New-England.

The BLIGHT BEETLE destroys the twigs similarly, perforating a minute hole at several of the buds instead of one only, but it is more common on the pear tree. See No. 56.

The OAK PRUNER, represented on plate ii., fig 2, in its larva state severs the small limbs, in summer, cutting them off as smoothly as though the work were done by a saw. It is rare on

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the apple and so common on the oak that the description of it will be given under the latter.

Wounding the twigs externally, causing them to break and fall.

- 13.** NEW-YORK WEEVIL, *Ithycerus Novæboracensis*, Forster. (Coleoptera Attelabidæ.)

A beetle in May and June, eating the buds and gnawing into the twig at their base, cutting it often to the pith.

A gray weevil, the largest one in this country, each of its wing covers with four white lines, which are interrupted by black dots, the thorax with three whitish lines. Length 0.35 to 0.60. See Horticulturist, vol. viii, p. 386.

- 14.** SEVENTEEN-YEAR LOCUST, *Cicada septemdecim*, Linn. (Homoptera. Cicadidæ.)

Appearing in June, in immense numbers, at intervals of seventeen years; making slits in the small limbs of the trees, in which to deposit its eggs, causing a profuse flow of sap from the wounds, the limb commonly perishing. A very large black fly with red eyes and four large glassy wings, the ribs of which are bright orange yellow. Width across the wings when spread, 2.50 to 3.25. See Trans. N. Y. State Agric. Soc. 1854, p. 742.

This locust will next appear in this State in 1860 along the Hudson river and on Long Island; in 1866 in the west end of the State; and again on Long Island in 1868 and 1872. S. Calverly, Esq., of Brooklyn, assures me that some of these locusts can be met with on Long Island every year.

DOG-DAY CICADA, see No. 72.

Puncturing the smooth bark of the limbs and extracting their juices.

- 15.** APPLE BARK-LOUSE, *Aspidiotus conchiformis*, Gmelin. (Homoptera. Coccidæ.)

An oblong flattish brown scale, one-eighth of an inch long, shaped like an oyster shell, fixed to the smooth bark and resembling a little blister; sometimes crowded together in such numbers as to wholly cover the bark. Beneath each of these scales from a dozen to a hundred minute white eggs, which hatch the latter part of May, giving out tiny lice, resembling minute white

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dots or atoms, which disperse themselves over the smooth bark and then become stationary, with their beaks inserted in the bark sucking its juices. Some of these ere many days acquire two wings and resemble small flies or midges. These are the males. The others remain fixed to the bark, die, and become overspread with a substance resembling fine blue mould, forming little patches upon the bark through most of the month of June. As this mouldiness wears off, the little blister-like scale first noticed again becomes visible, these scales being the dried relics of the females, forming a covering to protect their eggs through the autumn and winter. See Trans. N. Y. State Agricultural Soc. 1854, p. 732.

Of late years every orchard in the district adjacent to Lake Michigan has been ruined by this insect. Numerous remedies for abating the evil have been tried, without success. Now at last, it is pretty well ascertained that anointing the trees with grease or oil is an effectual remedy. I am assured of this by Dr. Hoy, of Racine, and other correspondents, and by several communications in the *Prairie Farmer* and other agricultural periodicals.

16. COTTON SCALE INSECT, *Aspidiotus Gossypii*, new species.

It may not be wholly out of place in this connection to observe that almost every tree and shrub, as well as many herbaceous plants, are infested, each with a species of bark-louse or scale insect peculiar to it. As yet, however, no insect of this kind has been recorded as pertaining to the cotton plant. But on some dried specimens of the *Gossippium religiosum*, sent me from Ningpo, China, by Rev. M. S. Culbertson, of the Presbyterian Board of Missions, I find a scale insect placed along the sides of the mid-vein, upon the under surface of the leaves. It is smaller than the scales of the apple bark-louse, pale yellow, flattened, of a broad oval form, pointed at one end, the opposite or rounded end being whitish, thin, and semi-transparent. It also shows a slender raised line running lengthwise upon each side of the middle, and slight transverse wrinkles. There is reason to apprehend that this insect may find its way to our shores at some future day, and become detrimental to one of the most important staple products of our country.

17. APPLE TREE BLIGHT, *Eriosoma lanigera*, Hausmann. (Homoptera. Aphidæ.)

Small patches of white down or cotton-like wool covering a cluster of minute pale lice; situated near the root, particularly around the base of twigs and suckers growing from the trunk,

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and where any wound in the bark is healing, and in autumn common also in the axils of the leaf stalks towards the ends of the twigs; sometimes so multiplied, in European countries, as to cover the whole under sides of the limbs, and also the trunk, the tree appearing as though it were whitewashed; preferring trees whose fruit is sweetest.

Under each small patch of down is commonly one large female and her young. The female is about 0.06 long, egg-shaped, dull reddish brown, with a black head and feet and dusky legs and antennæ. She is dusted over with a white mealy powder, and has a tuft of white down growing upon the hind part of her back, which is easily detached. See Harris's Treatise, p. 193.

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Puncturing them and extracting their juices.

18. APPLE APHIS OR PLANT LOUSE, *Aphis Mali*, Fab. (Homoptera Aphidæ.)
[Plate I, fig. 1, the male, fig. 5, the female.]

Small green lice without wings, accompanied by a few black and green ones having wings, crowded together in vast numbers upon the under sides of the leaves and the green succulent tips of the twigs, the leaves becoming distorted hereby and turned backwards, often with their tips pressing against the twig from whence they grow.

The winged individuals with a black thorax and a green abdomen, having a row of black dots along each side, and pale legs with black knees and feet. Length 0.05 to the tip of the abdomen. The wingless individuals slightly larger, with the thorax and abdomen green, the legs pale, with black feet. See Trans. N. Y. State Ag. Society, 1854, p. 753.

19. APPLE-LEAF APHIS, *Aphis Malifolia*, Fitch.

Found with the preceding on apple trees in Illinois; distinguished from it by being slightly larger and having the abdomen as well as the thorax black, the second fork of the wing veins at its tip nearer to the end of the fourth vein than it is to the end of the first fork, and other differences in the wing veins. See Trans. N. Y. State Ag. Society, 1854, p. 760.

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20. MOULDY APHIS, *Callipterus mucidus*, new species. (Homoptera Aphidæ.)

A solitary plant-louse, walking on the leaves or hovering on the wing in their shade, having its body, legs and antennæ coated over, more or less, with pruinose matter resembling fine bluish white mould. Pale green, whitish anteriorly, legs and antennæ black, their bases pale; wings clear and glassy with a small dusky or black cloud on the tips of the veins; the rib-vein whitish to the stigma, and from thence thicker and coal black. Length 0.075.

21. THORN-BUSH TREE-HOPPER, *Thelia Cratægi*, Fitch. (Homoptera Membracidæ.)
[Plate ii, fig. 5.]

On apple trees and more common on thorn-bushes, in July and August, standing upon the small limbs, and when approached by the finger, leaping away with a sudden strong spring and becoming lost to the view. A tree-hopper, shaped like a beech nut, 0.34 long, black varied with chestnut brown, with a large white spot on each side, which is prolonged forwards into a band across the front, and with a white band also across the hind part of its back, the anterior end of its back with a protuberance extending upwards perpendicularly.

In the present treatise I retain the genus *Thelia* in its original integrity, as proposed by Amyot and Serville, including in it those species only which have a horn-like protuberance, more long than wide, arising from the fore part of the thorax, and compressed and rounded at its summit. The genus as thus limited, embraces the *bimaculata* and *acuminata* Fab., the *belligera* Say, the *univittata* Harris, and the above species. In my Catalogue of the Homopterous insects in the State Cabinet of Natural History, published in 1851, I proposed the generic name *Telamona* for certain other species which could not be referred to any of the genera in Amyot and Serville's work, differing from *Thelia* in having a protuberance jutting up from the middle instead of the anterior part of the back, this protuberance being more wide than high when the insect is viewed in profile, and more or less square in its form. M. Fairmaire in his valuable memoir on the *Membracidæ*, in the fourth volume of the second series of the Annals of the Entom. Soc. of France, published a few years previous to my Catalogue, and giving much the most full and clear exposition of this group that has yet appeared, unites these insects to the genus *Thelia*, and also includes the genus *Smilia* of Amyot and Serville in the same genus, employing the name *Smilia* for an allied group of insects in which the apical cell of the fore wings is quadrangular instead of triangular. The *Thelia* of M. Fairmaire thus becomes an extensive genus, embracing insects which present notable differences in their external form. I know not why M. Fairmaire founds a portion

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of the genera in this family upon differences in the shape of the thorax, and disregards analogous differences here, especially since these differences are not in the least sexual here as they are in some of the other genera. I am therefore induced to retain the genus *Smilia* for those insects to which it was applied by Amyot and Serville, being a portion of the first section of this genus as it was originally proposed by Germar, and the equivalent of the first and second sections of M. Fairmaire's genus *Thelia*; his third section being the same with my genus *Telamona*, and his fourth section being the *Thelia* of Amyot and Serville, and of the present Report.

22. BUFFALO TREE-HOPPER, *Ceresa bubalus*, Fab. (Homoptera. Membracidæ.)
[Plate ii, fig. 4.]

A tree-hopper of similar form and the same habits with the preceding, appearing on this and most other trees from July till the end of the season. Color light grass-green when alive, freckled with whitish dots; anteriorly with a short sharp point on each side, jutting horizontally outwards, having some resemblance to the horns of a bull or buffalo. Length 0.30 to 0.40.

23. CALF TREE-HOPPER, *Ceresa taurina*, new species.

This is like the preceding in every respect, except that the space between the horns is concave instead of rectilinear. It is the insect named *Membracis taurina* in Dr. Harris's Catalogue, and perhaps is not a distinct species from the foregoing.

Several other kinds of tree-hoppers and leaf-hoppers occur upon apple trees, but being more common on oaks, willows, and other trees, will be noticed hereafter, each in connection with the tree to which it appears to be most attached. Several of these insects puncture the tender bark of the small limbs as well as the leaves.

24. LARGE TREE-BUG, *Arma grandis*, Dallas. (Hemiptera. Pentatomidæ.)
[Plate ii, fig. 7.]

A large flat bug, the size and somewhat the shape of a pumpkin seed, but with a conspicuous sharp spine projecting outwards on each side anteriorly. Color dull pale yellowish, with numerous minute brown punctures above and red ones on the under side, and with two burnished brassy green dots near each anterior angle of the thorax. Length of the male 0.60, female 0.75. Appearing on apple, oak and other trees from July till the end of the season.

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25. SPANGLED TREE-BUG, *Arma bracteata*, new species.

Like the preceding and of the same size, but darker colored, and having in addition to the brassy green dots of that species one on each anterior angle of the thorax, two on the middle of its anterior edge, and two others back of these last, with several small irregular greenish black spots on the scutel and wing covers. Rare. Met with in July.

26. SPINED TREE-BUG, *Arma spinosa*, Dallas.

Like the foregoing, but smaller and destitute of the brassy green dots; a dusky brown spot on the membranous tips of the wing covers; beneath with a row of black dots along each side of the middle, and a large round spot on the middle of the last segment; thighs with one or two black dots near their tips. Length 0.42 to 0.52. During summer and autumn common on apple trees throughout the United States. Very similar to the Modest tree-bug, No. 101.

Beetles eating the leaves.

ROSE BUG, see No. 50.

27. CLOAKED CHRYSOMELA, *Glyptoscelis crypticus*, Say. (Coleoptera. Chrysomelidæ.)

A thick cylindrical beetle, with its head sunk into the thorax and the thorax narrower than the body; pale ash gray from being entirely covered or cloaked with short incumbent whitish hairs; the closed wing covers showing a small right angled notch at the tip of their suture; scutel dusky. Length 0.32. Mr. Say met with this insect in Missouri, and my specimens are from the same vicinity, gathered by Wm. S. Robertson, who informs me that it eats oak leaves, but seems to prefer those of the apple tree, on which it is found in abundance.

Worms eating the leaves.

Probably a greater variety of worms are able to sustain themselves upon the leaves of the apple than upon those of any other tree. Some of these will be numerous during one or two seasons and will then scarcely be seen again for several years, whilst of others a few will be met with almost every year. Some of them

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take on different colors and marks with every change of their skins, so that a description of the full grown worm will not apply to it when it is small. Quite a number of these worms are yet unknown to us in their perfect state. Of those mentioned below, the eight first are caterpillars, clothed more or less densely with hairs; the four next are large thick bodied worms, and the remainder are small and more slender.

28. APPLE-TREE CATERPILLAR, *Clisiocampa Americana*, Harris. (Lepidoptera. Bombycidae.)

In May, forming large cobweb-like nests in the forks of the limbs; black, hairy caterpillars with white lines, and along each side a row of blue spots; living together in societies; finally dispersing and spinning oval white cocoons, placed in sheltered corners. The moth appearing the first of July, dull brownish red, its fore wings crossed by two straight white bands running parallel with the hind margin. Width of the wings when spread, 1.20 to 2.00. See Transactions of 1855, p. 413.

FOREST CATERPILLAR, *Clisiocampa sylvatica*. See Oak insects.

FALL WEB WORM, *Hyphantria textor*. See Cherry insects, No. 88.

HICKORY TUSSOCK MOTH, *Lophocampa Caryæ*. See Walnut insects.

29. YELLOW-NECKED APPLE-TREE WORM, *Eumetopona Ministra*, Drury. (Lepidoptera. Notodontidae.)

Clustered closely together and wholly stripping the leaves from a particular limb, in August; when alarmed holding both ends of their bodies stiffly upward; dull yellow, cylindrical worms thinly clothed with long soft hairs, with light yellow stripes and black heads, when older becoming black with a yellow neck and light yellow stripes. The moth varying from buff yellow to auburn brown, its fore wings crossed by three to five narrow brown or blackish bands, the forward one curved and transverse, the other straight and parallel with the hind margin. Width 2.00 to 2.40. See Transactions, 1855, p. 467.

30. AMERICAN LAPPET MOTH, *Gastropacha Americana*, Harris. (Lepidoptera. Bombycidae.)

In July, August and September, appressed to and resembling a natural tumor or swelling of the bark; a flattened ash-gray worm

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2.50 long, fringed low down on each side with tufts of blackish and gray hairs, and readily known by its having above on the fore part two bright scarlet velvety bands. The moth tawny reddish brown, the inner angle of its fore wings notched as though eaten off by a worm, and commonly a pale cloud extending from this notch towards the tip, edged often on each of its sides by a zig-zag dark brown line. Width 1.50 or more. Appearing the latter part of May. See Harris's Treatise, p. 293.

31. VELLEDA LAPPET MOTH, *Planosa Velleda*, Stoll. (Lepidoptera. Bombycidae.)

A worm similar to the foregoing in its habits and appearance, but of a faint pale green color with numerous irregular whitish lines resembling the streaks upon bark, and with a narrow black band above in the suture between the second and the third rings. The moth milk white with a large auburn brown spot on the middle of its back, its fore wings entire, dusky gray, crossed by a wavy white line near the hind edge and two others forward of this near the middle; the males scarcely half as large as the females. Width 1.25 to 2.75. See Harris's Treatise, p. 293.

32. AMERICAN VAPORER MOTH, *Orgyia leucostigma*, Smith and Abbot. (Lepidoptera. Arctiidae.)

In winter, clusters of white eggs and a dead leaf adhering to a whitish cocoon, attached to the twigs or limbs. In midsummer a slender caterpillar with pale yellow hairs and tufts and black pencils, its head and two small protuberances on the hind part of the back bright coral red. The moth dull smoky or sooty brown, its fore wings with a white dot near the inner angle, a rhombic black spot on the outer edge near the tip, with an oblique black streak forward of it, which is often prolonged to the inner margin and forms the hind edge of a broad ash gray band crossing the middle of the wing. Variable. Width 1.20 to 1.40. Females without wings, ash gray. See Transactions, 1855, p. 441.

33. CECROPIA EMPEROR MOTH, *Attacus Cecropia*, Linn. (Lepidoptera. Bombycidae.)

In August, consuming the whole leaf and its veins, a large cylindrical pale green worm three or four inches long and as thick as one's thumb, and having two rows of pale blue projecting

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points along each side, and two rows of pale yellow ones upon the back, with four larger bright orange or red ones anteriorly, all ending in little black prickles; attaching its large pod-like rusty gray cocoon to the side of a limb. The moth large, its wings dark gray, each with a large white crescent-like spot in the centre, margined with red, and beyond this a red band crossing both wings and margined on its fore side with white upon the hind pair. Appears in June. Width five to seven inches. See Harris' Treatise, p. 299.

A few words in explanation of the name of this moth may not be amiss in this connection. Sir James Edwin Smith says "we cannot in this instance commend the nomenclature of Linnæus, nor is it easy to conjecture what connection he imagined between this moth, magnificent as it is, and the city of Athens, to which its name implies it to belong." And Dr. Harris, echoing the same sentiment, remarks, "Cecropia was the ancient name of the city of Athens; its application, by Linnæus, to this moth, is inexplicable." The great legislator of this department of human knowledge, as he is expressively styled by Latreille, it has frequently been remarked, was endowed with a genius which few of his disciples have inherited, for selecting names for natural objects, which are most appropriate and happy. The idea which was present in the mind of Linnæus, when he named this splendid moth, we think is sufficiently evident. The Athenians were the most polished and refined people of antiquity. The moths are the most delicate and elegant of insects; they are the Athenians of their race. Cecrops was the founder, the head of the Athenian people. When the names of men were bestowed upon cities, ships or other objects regarded as being of the feminine gender, classical usage changed these names to the feminine form. The moths (*Phalæna*) being feminine, and the name of Cecrops being more euphonious in this form, probably induced Linnæus to change it in the manner he did. The name thus implies this to be the leader, the head of the most elegant tribe of insects, or in other words, the first of all the insect kind. What name more appropriate can be invented for this most sumptuous moth? It was in the cabinet of Queen Ulrica that Linnæus met with this species, and it appears that after having bestowed upon it this name, another species became

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known to him, vieing with this in its adornment and much surpassing it in size. One insect being already named, indicating it as the first of the whole race, what name could now be found which would suitably express the rank and importance of this new discovery? The great master was at no loss in this dilemma. The larger species was accordingly termed *Atlas*, indicating it to be the foundation upon which the whole insect world rests. How many have since been familiar with these most magnificent and princely moths, wholly unconscious of the tact and skill which Linnæus manifested in selecting the names which they bear!

Some explanation of the generic names which are adopted in this report, for this insect and those related to it, is also necessary. The name *Attacus*, meaning elegant, or connected to the Athenians, was originally given by Linnæus to a section or subgenus of his group *BOMBYCIDÆ*, having the wings expanded when at rest. Schrank afterwards gave the name *Saturnia* to these same insects. Germar subsequently revived the original Linnæan name, but most authors still continue the name proposed by Schrank. Duncan (Jardine's *Naturalists' Library*, vol. vii,) has recently proposed dividing these insects into quite a number of genera. Plain, and in the main judicious as his arrangement of them is, he in our view, improperly ignores the name *Attacus*, and unfortunately gives an erroneous location to some of the species. Thus our American *Cecropia* and *Promethea* are the two species which he figures and fully describes as illustrating his genus *Hyalophora*. Yet, as its name implies, this genus is characterised as having large hyaline glass-like spots on the middle of the wings. But no vestige of such spots exists in either of these species. The author has evidently been misled by figures, presuming the white spots represented in the centre of the wings to be hyaline, whereas they are opaque. A new situation must therefore be assigned to these two insects. And as the *Cecropia* is the first species of *Attacus* named by Linnæus, after those with glassy spots are removed, it may most appropriately be taken as the type of a genus to retain the original Linnæan name, which genus is particularly distinguished by having near the tips of the fore wings an imperfect eye-like spot, formed by a round black spot margined on its inner side by a bluish white line. In the centre of

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the wings also, at least in one sex, is a white crescent, beyond which a white or pale red band crosses both wings. In addition to our two American species, this genus includes the East Indian *Cynthia* of Drury, the parent of the Arrindy silk-worm, noted for yielding a fabric of such durability that garments made from it outlast a person's life time, and are handed down from parents to children, like other heir-looms in a family. These three insects also present as striking a resemblance to each other in their preparatory as in their perfect states. And these species being thus disposed of, the genus *Saturnia* will remain for those moths like *Pavonia*, which have large opaque eye-like spots in the centre of the wings.

34. APPLE SPHINX, *Sphinx Gordius*, Cramer. (Lepidoptera. Sphingidæ.)

The fore part of August, adhering when at rest to the under side of a twig, with the forward half of its body held obliquely outward. A thick, cylindrical apple-green worm, 2.50 long, with a reddish brown horn projecting upward from the hind part of its back, and along each side seven oblique violet stripes margined on their hind side with white. Burying itself deep in the earth and producing a large strong narrow-winged moth the following May or June, its fore wings sooty brown varied with ash gray, with black streaks between the veins and a white dot near the middle, placed upon a long slender black line. Width 2.80 to 3.50. See Silliman's Journal, vol. xxxvi. p. 295.

35. BLIND-EYED SPHINX, *Smerinthus excacatus*, Smith and Abbot. (Lepidoptera. Sphingidæ.)

Similar in size, habits and appearance to the preceding, but the worm with a rough granular skin of an apple green color, with the horn bluish, the seven streaks along each side narrow, yellowish white, and two short pale lines before. The moth with rose red hind wings, having near their inner angle a black spot with a pale blue centre. Rare. See Silliman's Journal, vol. xxxvi, p. 290.

36. LARGE YELLOW BUTTERFLY, *Papilio Turnus*, Linn. (Lepidoptera. Papilionidæ.)

In August, commonly seen resting day after day upon a small mass of cobweb-like threads upon the upper surface of a particu-

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lar leaf, a pretty, bright leaf-green, thick, smooth worm, tapering, thickest anteriorly, where on each side is an eye-like spot formed of a black spot having a pale blue centre and surrounded by a pale yellow ring which is widened on its upper side and has a short black line in this widened part. Growing to 1.25 in length and 0.40 thick. The pupa naked, attached to the side of a limb and held in its place by a silken thread passed around its body in the form of a loop. The butterfly appearing in June, of a rich pale yellow color, its wings with a broad black border in which is a row of yellow spots, and with four black streaks, the inner one extending across both pairs. Width 3.00 to 4.75. Somewhat common.

37. RED-HUMPED PROMINENT, *Notodonta concinna*, Smith and Abbot. (Lepidoptera. Notodontidæ.)

In August, in a cluster, eating all the leaves from the end of a particular limb, cylindrical prickly worms striped with black and tawny yellow, and on each side with white also, with bright red heads and a slight hump on the fourth ring, and with two rows of black prickles along the back and shorter ones upon the sides. Length 1.25. Forming a cocoon under leaves upon or slightly under the earth. The moth appearing the last of June; light brown, its fore wings dark brown on the inner and grayish on the outer margin, with a dot near the middle, a spot near each angle and several longitudinal streaks along the hind margin dark brown. Width 1.00 to 1.20. See Harris's Treatise, p. 329.

UNICORN PROMINENT, *Notodonta unicornis*, see Plum insects, No. 66.

HAG MOTH, *Limacodes pithecium*, see Cherry insects, No. 85.

38. CANKER WORM, *Anisopteryx vernata*, Peck. (Lepidoptera. Geometridæ.)

The last of May and in June, piercing small holes in the leaves and when larger consuming all the leaf except the large veins. A very variable measure-worm, nearly an inch long, ten-footed, black, clay-yellow or greenish, commonly with an ash-gray back and a pale yellowish stripe along each side. The pupa state passed under ground, the moth hatching late in autumn and on warm days in winter, but mostly early in the spring; the female gray, without wings, crawling up the trunk of the tree to deposit her eggs; the male with large very thin silky ash-gray fore wings,

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with a whitish spot on their outer edge near the tip and crossed by two jagged whitish bands having blackish dots along their edges, and a row of black dots at the base of the fringe. Width 1.25. Very variable, the white bands often wanting. A smaller kind (*Anisopteryx pometaria*, Harris,) without the white spot and bands and with the fore wings crossed by three interrupted dusky lines, is thought by Dr. Harris to be perhaps a distinct species. See Harris's Treatise, p. 359.

39. V-MARKED MEASURE WORM, *Erannis Tiliaria*, Harris. (Lepidoptera. Geometridæ.)

In June, eating large notches in the sides of the leaves; a very variable ten-footed measure worm 1.25 long, brownish black or pale yellow, often with black, white and pale yellow stripes along its back, its head pale with rusty freckles, and commonly a black V-shaped mark upon the front. The pupa under ground, the moth appearing late in autumn; the females wingless; the males nankin yellow, their fore wings large, thin, sprinkled with brown atoms and crossed by two wavy brown lines, the forward one often faint or wanting; a brown dot near the middle of both wings. Width 1.50 to 1.75. See Harris's Treatise, p. 370.

40. APPLE TORTRIX, *Brachytænia Malana*, Fitch. (Lepidoptera. Tortricidæ.)

In June and September, eating irregular notches in the margin and holes in the middle of the leaves; a rather thick, cylindrical light green worm an inch long, with five white lines and numerous white dots. The pupa in a cocoon in a curved leaf. The moth appearing in July and again in the cold months, its fore wings ash-gray, whitish toward the outer margin, and crossed by three distant zigzag black lines which are faint or indistinct towards the inner edge. Width 0.80 to 1.15. See Transactions, 1855, p. 473.

41. UNSTABLE DRAB MOTH, *Orthosia instabilis*, Schifferrmyller. (Lepidoptera. Noctuidæ.)

A worm which I have supposed was the same with that of the preceding species, but which appears to be rather thicker bodied, as though it had been fuller fed, and grows to a size a fourth larger, and enters the ground to pass its pupa state, was alluded to in my last Report. Moths which I knew had come from these larger

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worms, I obtained last winter. They appeared to be identical with a very common European species, named *Orthosia instabilis*, but as authors speak of that insect as feeding only upon oak leaves, I was in doubt whether I would be justified in pronouncing this which feeds upon the apple to be the same. In April, however, on going by night into a forest chiefly of oak trees, this same moth was discovered quite common there. It was clinging around the wounds made in the sugar maples, drinking the sap which flowed therefrom, and instead of flying away when the light of the lantern approached, it merely dropped itself among the dead leaves for concealment, frequently falling into the vessels of sap and drowning therein. It was evident that these moths had come from worms which had fed on the foliage of the surrounding oaks. All doubts of the insect in question being identical with that of Europe were thus resolved. The larva is described in books as being green, with a white line upon the back and a pale yellow one upon each side. It is when it is young and small that it answers to this description. When larger it commonly presents five white lines and the surface becomes freckled with white dots. I once was not a little vexed with myself on finding my memoranda of one of these worms which I was feeding, to be very incorrect; but subsequent observations showed that it was the worm that had changed. The species may well be called unstable, as not only the larva but the moth also is extremely variable; insomuch that authors have heretofore named and described a half dozen species from what are now regarded as mere varieties of this insect. It is commonly of an ash-gray color, varied more or less with rusty. Near the middle of the fore wings is a faint round spot and behind it a kidney-shaped one, of a blackish-gray color margined by a whitish line, the space between these spots rusty and often extended into a band crossing the wing. Towards their hind edge is a rusty transverse streak on the middle, and in a line with it a spot of the same color upon the outer and another upon the inner margin. Width of the spread wings, 1.50.

42. PALMER WORM, *Chatochilus Pometellus*, Harris. (Lepidoptera. Tineidæ.)

Appearing the latter part of June, at times excessively numerous, residing in worm-eaten leaves drawn together by silken

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threads, and when jarred dropping and hanging in the air suspended by a thread; a pale yellowish green worm, having a dusky or blackish stripe along each side of the back edged on its upper side by a narrower whitish stripe, and with a dusky line on the middle of the back. The pupa remaining in the same mass of leaves occupied by the worm, and giving out the moth in about ten days. The moth ash-gray, with its fore wings sprinkled with black atoms, and having four black dots near their middle and six or seven smaller ones around their hind edge. Width 0.65. See Transactions, 1855, p. 453.

43. TAWNY-STRIPED PALMER WORM, *Chatochilus Malifoliellus*, Fitch.

The fore part of July, residing in a folded worm eaten leaf; a slender pale yellowish worm with a tawny yellow stripe along each side of its back, this stripe having a white stripe upon its lower as well as its upper side, and a pale yellow head. The moth like the preceding, but the fore wings not sprinkled with black atoms, and having, in addition to the dots of the common palmer worm moth, a tawny yellow band toward the tips of the wings, edged with whitish on its fore side. See Transactions, 1855, p. 463.

44. COMRADE PALMER WORM, *Chatochilus contubernalellus*, Fitch.

Appearing in company with the Palmer worm, and closely resembling it, but having the head and neck shining black instead of light yellow. The moth also sprinkled and dotted like that of the Palmer worm, but the ground color of the fore wings dark brown on their inner and white on their outer half. See Trans. 1855, 464.

45. EYE-SPOTTED BUD MOTH, *Spilonota oculana*, Harris. (Lepidoptera. Tortricidæ.)

In May and June, with silken threads fastening the young leaves together as they are starting from the buds, and living within and feeding upon them; a small pale dull brownish worm with shining elevated dots each giving out a fine hair, its head, neck and a spot on the top of the eighth ring dark brown. Changing to a pupa in the same nest, from which the fore part of July comes a small moth of a dark ash-gray color, its fore wings whitish in the middle, mottled with dark gray, the tips light brown with four little black

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marks forming an eye-like spot, and another near the inner angle formed by three minute black spots arranged in a triangle, having often a black dot in its centre. Width 0.50 to 0.60. This is probably identical with the European *ocellana* of Schifferrmyller, afterwards named *luscana* by Fabricius and *comitana* by Hubner, Stephens, and others. See Harris's Treatise, p. 377.

46. ROSACEAN TORTRIX, *Lozotania Rosaceana*, Harris. (Lepidoptera. Tortricidæ.)

In May and the fore part of June, with silken threads drawing together the young leaves at the ends of the limbs, secreting itself within them and feeding thereon; a slender pale green or yellowish green worm, sometimes flesh red or brownish, 0.75 long, its head and neck above brownish, often a darker green stripe along its back, and with a few smooth dots, each yielding a short fine hair; changing to a pupa within its nest, from which about the first of July comes a short broad flat moth, resembling a bell in its outline, its color dull nankin or drab yellowish, of a dusky shade from numerous small wavy dark brown lines crossing its fore wings, on which are three slightly darker broad oblique bands, situated upon the base, the middle and the hind part. Width of the spread wings 1.10. See Harris's Treatise, p. 376. Both the worms and the moths vary greatly as they are reared upon rose, apple, peach or cherry and other leaves, and it is very doubtful whether this is different from a common European insect possessing the same habits—the Rose Tortrix (*L. Rosana*, Linn.) the several varieties of which have heretofore been regarded as distinct species.

47. ROSE HISPA, *Uroplata rosea*, Weber. (Coleoptera. Hispidæ.)

In July, large brownish blister-like spots appearing upon the leaves, from a leaf-mining worm in their interior, eating the green parenchyma and leaving the skin entire; the worm 0.20 long, tapering, flattened, soft, yellowish white, its head and neck blackish; changing to a pupa in the leaf, from which in six or seven days comes a small flat coarsely punctured beetle, its wing covers forming an oblong square, tawny yellow, posteriorly red or purple, which color extends forward to the shoulders and onwards upon the sides of the thorax in a stripe which is often black. Length

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0.20 to 0.25. Variable in its colors. This is the *Hispa quadrata* of Fabricius; whether it is the anteriorly described *rosea* of Weber is somewhat doubtful. See Harris's Treatise, p. 106.

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48. CODLING MOTH, *Carpocapsa Pomonella*, Linn. (Lepidoptera. Tortricidæ.)

Feeding upon the core and its seeds, causing much of the young fruit to wither and fall, and occurring also in ripened stored apples; a small white worm with a shining black head and neck and with little smooth dots arranged in pairs, each giving out a fine hair; when larger becoming flesh colored with a tawny brown head and neck; in summer completing its growth in three or four weeks, and coming out through a hole gnawed in the side of the apple; surrounding itself with a white web in a crevice of the bark or similar situation and there passing its pupa state; the moth appearing the latter part of June, but straggling individuals occurring the whole year round, dropping their eggs singly upon the flower end of the apple, from which the young worm penetrates inward to its centre. The fore wings of the moth occupied by alternate irregular transverse wavy streaks of ash-gray and brown, and on the inner hind angle a large tawny brown spot, which is bordered by a brilliant golden mark nearly in the form of a horse shoe. Width 0.75. See Kollar's Treatise, p. 229.

49. APPLE MIDGE, *Molobrus Mali*, Fitch.

(Diptera. Tipulidæ.)

In the interior of ripened and stored apples, accelerating their decay, whilst the outer surface remains fair; numerous slender tapering glassy-white maggots; changing to pup in the interior of the apple, from whence come a small slender black midge, 0.15 long, its abdomen blackish with a pale yellow band at each of the sutures, and its wings hyaline tinged with smoky. See Transactions, 1855, p. 484.

PLUM WEEVIL. This makes the same crescent-shaped wound upon young apples as on plums, causing them to drop to the ground prematurely. See Plum insects, No. 70

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50. ROSE BUG, *Macroductylus subspinosus*, Fabr. (Coleoptera. Melolonthidæ.)

Clustering, sometimes in multitudes, upon the young apples and devouring them, the latter part of June, and when these do not suffice it, eating the leaves also; infesting likewise roses, grape vines, plums and cherries:—a smallish oblong buff-yellow beetle, with shining yellow legs and very long black feet. Length 0.35 to 0.40. See Transactions, 1855, p. 477.

51. APPLE THRIPS, *Phlæothrips Mali*, Fitch. (Thysanoptera. Thripididæ.)

Appearing in a roundish cavity ate near the tip end of the young fruit; a minute, very slender blackish-purple insect with narrow silvery-white wings lying upon its back resembling a long Y-shaped mark. Length 0.06. See Transactions, 1854, p. 806.

WASPS and HORNETS are frequently in the habit of feeding upon growing apples and other sweet fruits, gnawing small roundish cavities in them, and also in autumn when prepared apples are placed in the sun to dry numbers of the same insects are again attracted to them. The common hornet, *Vespa maculata*, Linn., the yellow jacket, as it is usually designated, *Vespa vulgaris*, Linn., and our common wasp, *Polistes fuscata*, Fab., are the chief species which depredate in this manner. But as these insects are most important on account of the injuries they are liable to inflict upon our persons, the description of them more appropriately belongs to another branch of this subject.

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2. THE PEAR.—*Pyrus communis*.

Most of the insects which infest the apple will be found to attack the pear also, in the same manner, these two trees being so closely related to each other. It will not therefore be necessary to repeat their names. A few insects, however, appear to pertain to the pear exclusively, and some belonging to other trees are found upon the pear that have not yet been noticed upon the apple. These are named below.

AFFECTING THE TRUNK, BARK AND LIMBS.

52. PEAR-TREE BORER, *Trochilium Pyri*, Harris. (Lepidoptera. Trochiliidæ.)

Particles of powder, like sawdust, appearing upon the bark, thrown out by a worm underneath, resembling the Peach-tree borer, but much smaller; feeding mostly upon the inner layers of the bark and there changing to a pupa; the moth coming out in autumn, resembling a wasp, of a purple black color with a broad yellow band on the middle of its abdomen and two narrow ones forward of it, its under side golden yellow and its wings clear and glass-like, their veins, margin and fringe purplish black, and the ends of the forward pair blackish with a coppery yellow gloss. Width 0.55. See Harris's Treatise, p. 256.

PIGEON TREMEX, *Tremex Columba*, a large soft white worm boring deep in the interior of the wood. See Maple insects.

PLUM WEEVIL, *Conotrachelus Nenuphar*. (See No. 70.) In the winter season, small crescent-shaped incisions appearing in the smooth bark of the limbs, with the bark upon the convex side of this wound elevated in a slight blister, in the cavity of which lies several minute maggots, supposed to be the larvæ of the plum weevil in their winter quarters.

I am reluctant to publish any observations which are not fully completed and known to be fully authentic. An affection of the bark of the pear tree, however, has been presented to my notice, which is of too much interest to be omitted in this place, although

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I am not perfectly certain that it is caused by the insect to which I attribute it. The importance of the facts which I have to report, will appear from a few preliminary remarks.

The history of the plum weevil or curculio, so far as at present known, is briefly as follows. The beetle makes its appearance in May and June, cuts a crescent-shaped incision in young plums and other fruits, dropping an egg in the wound, the worm from which, boring in the fruit, causes it to fall from the tree, and the worm becoming full grown, buries itself in the ground, where it remains from three to six weeks, and having completed its transformations the beetle again comes abroad in July and August. But what becomes of it from this time until the following spring is not yet ascertained. Although this insect and its destructive habits have been so long known in this country, and every owner of a plum tree has year after year endured the most vexatious disappointments from it, we to this day remain in ignorance of its abode and condition during half the year. Most persons who have written upon it, have supposed that some of the worms were so late in leaving the fruit that they remained in the ground through the winter and from these come the beetles which appear in the spring; and several of the remedies which have been recommended for abating this evil have been based upon this theory. But that a whole generation of these insects should be brought forth abortively each summer, to perish without making any provision for a continuance of their species, and that their perpetuity should every year be left to such a mere accident as a few individuals casually belated in coming to maturity, would be an anomaly wholly unlike anything which we meet with elsewhere in this department of nature's works. And Dr. E. Sanborn of Andover, Mass., in several communications published in the *Boston Cultivator* and *Cambridge Chronicle* in 1849 and 1850, gives it as the result of a series of observations which he had made upon the larvæ, that at no season of the year do they remain longer than six weeks in the ground, and that neither they nor the perfect insects lie under the ground during the winter. Dr. Harris hence infers, in the last edition of his *Treatise*, that those beetles which come out the latter part of summer lurk in some place not yet discovered, during the winter, to come abroad again in the spring and deposit their eggs in the fruit.

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But I now come to present a fact which I think will be more satisfactory to the reader as to the place and circumstances in which this insect passes the winter, than anything which has yet been given to the public. In April, 1856, I received from L. B. Langworthy of Rochester, a portion of the limb of a pear tree, four and a half inches long and less than half an inch thick, upon which were about thirty short curved or crescent-shaped incisions in the bark, similar to those made by the curculio upon fruit. They were all cut lengthwise of the bark, about 0.15 in length, and upon their convex side the outer layer of the bark was elevated in a little blister-like spot extending the whole length of the crescent and about half as broad as long. On raising this, so as to expose the cavity beneath, several little worms, commonly six in number, were found therein, torpid and lying in a row side by side with their tails toward the crescent and their mouths in contact with the soft green pulp or parenchyma forming the middle layer of the bark, ready to eat their way onwards as soon as the warmth of spring awakened them again to activity. These worms were rather long and narrow, 0.05 in length, broadest across their middle, tapering to a point at one end, the opposite or head end being rounded. They were without feet, transparent and pale yellowish, resembling little specks of gum or turpentine. They had evidently come from eggs which had been dropped in the curved incision. A few of these incisions had no elevation of the bark along their side, in which instances the weevil had doubtless been disturbed and abandoned her work before it was completed, or the eggs which she deposited in the incision had been discovered and devoured by some predaceous insect.

Although until these worms have been reared we cannot be certain what they are, there is the strongest presumptive evidence that they are the progeny of the plum weevil. Fifty years ago, one of the best authorities in our country upon a topic of this kind, Rev. F. V. Melsheimer of Pennsylvania, stated that the larva of this insect lived under the bark of the peach tree. But from that day to this, no one of the many who have undertaken to investigate this insect, have given any confirmation of this statement. Yet in the light of what is reported above, we cannot but regard it as true. We are informed by Kollar, that the plum

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weevil of Europe (*Rhynchites cupreus*) when there is no fruit for it, resorts to the new shoots in which to place its eggs. All the circumstances, therefore, lead us strongly to the opinion that the conjecture advanced by Dr. Harris in the first edition of his Treatise, but since abandoned by him, is correct, namely, that those beetles which are hatched the latter part of the season, finding no young fruit in which they can deposit their eggs, are obliged to resort to the smooth tender bark of the branches of our different fruit trees, and the worms from these eggs repose in, not under the bark, through the winter, and produce the beetles which appear the following June and oviposit in the young fruit.

If this opinion as to the winter quarters of the curculio proves to be correct, it may lead us to most important results. After allowing for all casualties, it is probable that a hundred beetles might have been matured from the short piece of limb which came under my observation. The worms, however, are only covered by the epidermis and the thin outermost layer of the bark. Soft-soap or some other alkaline substance applied externally, there is little doubt would penetrate through this covering sufficiently to destroy these worms when they are so small and tender. And it appears probable that by a careful inspection of the limbs of those trees whose fruit has been destroyed and other trees standing adjacent to these, the winter retreat of this enemy may be discovered by the marks he places upon the bark, and a remedy may then be applied with greater ease and which will be more effectual for his destruction than anything hitherto suggested.

53. PEAR BARK-LOUSE, *Lecanium Pyri*, Schrank. (Homoptera. Coccidæ.)

A hemispherical shell, the size of a half pea, of a chestnut brown color, adhering to the under side of the limbs. See Transactions, 1854, p. 809.

54. SCURFY BARK-LOUSE, *Aspidiotus furfurus*, new species. (Homoptera. Coccidæ.)

Little round or oval white wax-like blisters on the smooth bark of the pear tree.

I know this only from specimens found upon the same limb of the pear tree from the garden of L. B. Langworthy of Rochester, on which the incisions of the plum weevil above spoken of occurred.

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The bark of this limb was covered with an exceedingly thin gray film, appearing as though it had been coated over with varnish, which had dried and cracked and was peeling off in small irregular flakes, forming a kind of scurf or dandruff upon the bark. In places this pellicle was more thick and firm and elevated into little blister-like spots of a white color and waxy appearance, of a circular or broad oval form, less than the tenth of an inch in diameter, abruptly drawn out into a little point at one end, which point was stained of a pale yellowish color and commonly turned more or less to one side. On breaking open any of these spots with the point of a needle, quite a number of exceedingly minute oval eggs of a glossy bright purple color were found beneath. These eggs probably produce mites of such minute size as to be wholly imperceptible to the naked eye, myriads of which, there is little doubt, at times overrun the bark of particular trees of this kind, exhausting their juices and causing them to pine and droop, when the proprietor is wholly unable to discover the occasion of their unthriftiness. The habits and changes of this insect will be similar to those of the Apple bark-louse, (No. 15) and other kindred species. It is probably this species as it appears in autumn, of which, as this page is passing through the press, I notice some valuable observations by A. O. Moore, in the American Agriculturist, vol. xvi., p. 287.

55. PEAR-TREE PSYLLA, *Psylla Pyri*, Linn. (Homoptera. Psyllidæ.)

The smaller limbs and twigs drooping, their bark rusty blackish, and a multitude of ants and flies gathering around them to feed on the honey dew which is dropped copiously by a small yellow jumping insect resembling a louse, which punctures the bark and sucks its juices, frequently killing the tree. After the middle of summer appearing with transparent wings, and its head deeply notched in front, its color now being orange yellow with the abdomen greenish. Length 0.10. See Harris's Treatise, p. 202.

56. PEAR BLIGHT BEETLE, *Scolytus Pyri*, Peck. (Coleoptera. Scolytidæ.)

Particular twigs of the pear, apple, plum and apricot suddenly withering and dying in the middle of the summer; small perfo-

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rations like pin holes appearing at several of the buds, from which perforations issue a small cylindrical beetle of a deep brown or black color, its antennæ and legs rust-yellow. Length 0.10. This works also in the trunk of the tree, earlier in the season, as already stated, page 327. See Harris's Treatise, p. 78.

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CHERRY SLUG-WORM, *Celandria Cerasi*. A shining slimy blackish slug worm, shaped like a tadpole, in June and July consuming the parenchyma of the leaves and leaving their veins entire; some years destroying almost the whole of the foliage. See Cherry insects, No. 92.

57. GOLDSMITH BEETLE, *Areoda lanigera*, Linn. (Coleoptera. Scarabæidæ.)

In May and June, eating the leaves of this and of various forest trees, a large thick oval beetle of a shining lemon-yellow color, its thorax of a greenish golden tinge, and its under side coppery or dark green with white hairs. Length 0.80 to 1.00. See Harris's Treatise, p. 21.

AFFECTING THE FRUIT.

58. PEAR BLISTERING FLY, *Cantharis Pyrivora*, new species. (Coleoptera. Meloidæ.)

Early in June devouring the young fruit, a long cylindrical blistering beetle, of a green-blue color and not shining, its legs orange yellow with the hips, knees, feet and tips of the shanks blue-black and the antennæ black. Length 0.90.

For specimens of this insect I am indebted to my friend Wm. S. Robertson, who informs me they were taken upon a pear tree at Canajoharie about the first of June, 1838. Soon after its flowers had fallen these beetles made their appearance, in numbers, eating the young fruit voraciously and in a short time destroying all or nearly all upon the tree. I have also received this same insect from the southern section of the State. It equals in size our largest American *Cantharis* hitherto known, the *Nuttallii* of Say (*fulgifer* Le Conte) but is destitute of the brilliancy belonging to

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that species. As the insects of this genus vary in their size it is with considerable hesitation that I enter this as a distinct species, it corresponds so closely in its colors and other characters with the *ænea* Say (*nigricornis* Le Conte). My examples of that species, however, have the exact dimensions assigned to it by Say and Le Conte (0.55), whilst all my examples of this species are more than a third larger. They moreover have the anterior as well as the middle shanks curved.

To test the blistering qualities of this species three of the legs of a specimen nineteen years old were pulverized and mixed with a little cerate and bound upon my arm. In six hours the spot was as nicely vesicated as though the best Cantharides of the shops had been employed.

The worm of the CODLING MOTH (No. 48) and of the PLUM WEEVIL (No. 70) are as prone to infest the interior of pears as of apples.

3. THE QUINCE.—*Cydonia vulgaris*.

The only insects known to us as occurring upon the quince are the same that are found upon the apple, and also the Cherry slug worm, No. 92. Its worst enemy is the APPLE TREE BORER (No. 2) which appears to prefer the quince to any other tree; and in districts where this insect abounds it is found to be almost impossible to grow this fruit.

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4. THE PEACH.—*Persica vulgaris*.

AFFECTING THE ROOT.

59. PEACH-TREE BORER, *Trochilium exitiosum*, Say. (Lepidoptera. Trochilidæ.) [Plate I, fig. 6 the male, fig. 7 the female.]

Boring in and eroding the bark and solid wood, causing the gum to exude so copiously as to form a thick mass around the root intermingled with the castings of the worm, which is cylindrical, soft, white, with a tawny yellowish red head and sixteen feet, and grows to more than half an inch in length. It forms a tough pod-like cocoon on the side of the root, jutting slightly above the surface. The moth comes abroad the last half of July and in August, and resembles a wasp in its appearance. It is of a dark steel blue color, and in the male the wings are clear and glassy with a dark blue band extending nearly across the forward pair beyond the middle, whilst in the female only the middle of the hind wings are clear and glassy and her abdomen has a broad bright orange yellow band upon its middle. Width 0.80 to 1.30. See Transactions, 1854, p. 813.

This important insect is so well known throughout our country under the technical name *Ægeria exitiosa* that it is unfortunate this term cannot remain undisturbed. But so long ago as 1777 Scopoli gave the name *Trochilium* to the same insects for which the Fabrician name *Ægeria* was published thirty years afterwards. The latter name, therefore, is merely a synonym of the former, and is wholly rejected by the latest and best authorities.

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APPLE BUPRESTIS, a flattened pale yellow grub under the bark mining in the sap wood. See No. 3.

DIVARICATED BUPRESTIS, a worm similar to the preceding and found in the same situation. See No. 71.

60. ELM BARK-BEETLE, *Tomicus liminaris*, Harris. (Coleoptera. Scolytidæ.)

Small perforations like pin holes appearing in the bark particularly of diseased trees, from which in August and September

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issues a minute cylindrical bark-beetle of a dark brown color, its wing covers with deeply impressed punctured furrows and short hairs and its thorax also punctured. Length 0.10 or less. I have obtained this from elm bark, the same situation in which Dr. Harris found it, and this is doubtless its original residence. But Miss Margaretta H. Morris has met with it under the bark of peach trees which were affected with "the yellows." See Downing's Horticulturist, vol. ii, p. 502.

The PEACH-TREE BORER above described (No. 57) is not confined to the root, but frequently occurs also under the bark of the trunk, particularly in the forks of the limbs, causing the gum to exude from the spot where it nestles.

The OAK PRUNER, or a species possessing the same habits, bores in the heart of the small limbs, the latter part of summer, a few inches or a foot or more in length, and then girdles the limb, severing the wood as smoothly as though it were cut off by a saw. See insects of Oak limbs.

61. PEACH BARK-LOUSE, *Lecanium Persicæ*, Modeer. (Homoptera. Coccidæ.)

Fixed to the smooth bark, commonly beside a bud on the origin of a twig, a blackish hemispherical shell the size and shape of a half pea, its surface uneven, shining, commonly showing a pale margin and stripe upon the middle; covering a multitude of minute eggs which hatch small lice like mites, which scatter themselves over the bark, puncturing it and sucking its juices, similar to the pear bark-louse No. 51.

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62. PEACH TORTRIX, *Cræsia Persicana*, new species. (Lepidop. Tortricidæ.)

Early in May when the young leaves are putting forth from their buds, a worm tying them together with fine silken threads, secreting itself within and feeding upon them; the worm rather slender, pale green with a whitish streak along each side of its back and a pale dull yellowish head; changing in its nest to a pupa about the middle of June and giving out the winged moth the beginning of July. The moth with the fore wings rusty yel-

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low varied with black, their basal third much paler tawny yellow; a large triangular white spot on the middle of the outer margin; a transverse white streak forward of the middle of the hind edge, which is divided by the veins crossing it into about four spots, and is bordered on its anterior side by a curved black band. Width 0.65.

Having bred this moth from worms gathered upon the peach, I name it accordingly, though it is quite probable that, like other insects of this family, it feeds upon the foliage of several different trees. I have never observed it till the present season, and presume that like many of its kindred, it will be common at times, and will scarcely be seen again for several years. Of the species mentioned in the books it most resembles the *Schreberiana* as figured by Wood and described by Stephens (*Haustellata*, iv, p. 81.) We learn, however, from Stephen's List of the British Museum, that the specimen from which this figure and description were taken is suspected to be North American, and is not the true *Schreberiana*, but according to Mr. Doubleday (*Zoologist*, v. p. 1729) is the *trileucana* of Gmelin. There must be some error in this citation, however, as no species bearing this name occurs in Gmelin. Even though the specimen alluded to should be American and already named, the insect before us appears to be a different species, that having, among other discrepancies, a pale streak upon the hind edge of the fore wings, whilst here the corresponding streak is distinctly forward of the hind edge.

ROSACEAN TORTRIX. Another worm tying peach leaves together in the same manner and at the same time with the preceding, differs from it in being destitute of the whitish stripe or line along each side of the back. It is light green with a line along the middle of the back of a deeper green color, which is often faint or wholly wanting. I have frequently found these worms upon the peach, and some of them which I have reared have produced moths which I can only regard as being a dark colored variety of the exceedingly variable Rosacean Tortrix already described. See No. 46.

The APPLE SHOULDER-STRIPED TORTRIX also feeds upon the leaves of the peach, but makes no nest in which to secrete itself.

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It closely resembles the foregoing, but has three white or pale yellow stripes when young, and five when mature, and is also then freckled with pale dots. See No. 40.

The UNSTABLE DRAB MOTH, occurs also upon the peach, at the same time with the preceding, and most closely resembles it as already stated. See No. 41.

63. PEACH APHIS, *Aphis Persicæ*? Sulzer. (Homoptera. Aphidæ.)

This begins to appear upon the first small leaves which protrude from the buds and continues through the season unless swept away, as it frequently is, with surprising suddenness, by its several insect enemies. (See Transactions, 1854, pp. 767-806, where a full account of our American destroyers of the Aphides will be found.) It punctures the leaves to suck their juices and is a common though probably not the only cause of "the curl." It lives together in crowds, hid in the crevices of the curled, corrugated leaves, most of the individuals being larvæ and wingless females. The winged individuals are 0.12 long, black with the under side of the abdomen dull green, the shanks and bases of the thighs pale brownish, and the horns or horny tubes as long as to the tip of the abdomen. This would appear to be different from the European peach aphis as figured in Koch's invaluable monograph and described by Fonscolombe and others, though the wing veins coincide with Walker's description. I however have not yet given this insect a careful examination, and have noticed individuals so unlike those above described that they seemed to be another species.

The BUFFALO TREE-HOPPER, a light green jumping insect shaped like a beech nut, puncturing and sucking the juices. See No. 22.

The SADDLED LEAF-HOPPER, a smallish oblong black jumping insect with a large bright yellow spot like a saddle upon the middle of its back. See No. 69.

AFFECTING THE FRUIT.

The PLUM WEEVIL (No. 70) bores in the young fruit, causing it to drop from the tree. The ROSE BUG (No. 50) sometimes invades this fruit also, nibbling and killing it.

5. THE NECTARINE.—*Persica laevis*.

The PLUM WEEVIL (No. 70) and other insects which depredate upon the peach are liable to attack this tree in the same manner.

6. THE APRICOT.—*Armeniaca vulgaris*.

The PEAR BLIGHT BEETLE (No. 56) sometimes kills particular twigs of the apricot in summer. The PLUM WEEVIL (No. 70) bores in the fruit, and several of the other insects which attack the plum may at times be met with upon this tree.

7. THE PLUM.—*Prunus domestica, et al.*

AFFECTING THE ROOT.

The PEACH TREE BORER (No. 59) occurs in the root of the plum also, boring under the bark and destroying young trees, but without causing any gum to exude as it does in the peach. See Transactions, 1854, p. 816.

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The PEAR BLIGHT BEETLE (No. 56) occasionally causes the death of a single twig upon one part and another of this tree in summer.

64. UNARMED TREE-HOPPER, *Smilia inermis*, Fab. (Homoptera. Membracidae.)

In August and September, making straight short incisions, about 0.10 long, in the bark of the small limbs, particularly where the new growth of the year commences, and dropping a little cluster of minute eggs therein, which remain till the sap begins to circulate the following spring, when they hatch insects resembling small mites, which immediately wander away from the spot and subsist upon the juices of the leaves and green succulent twigs, which they puncture with their minute sharp beaks. These insects will be found fully grown in July and are then about 0.28 long

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and of a triangular shape, resembling that of a beech nut, and of a uniform pale green color without any spots or stripes. Like other tree hoppers (which name I apply to insects of the family *Membracidæ*) and leaf hoppers (*Tettigoniidæ*) these insects when approached by the finger give a sudden strong leap and become lost to the view.

I am indebted to George Clark, Esq., of East Springfield, Otsego county, for the above information respecting the work of an insect, which, from his description of it, will be the species which I have named; but specimens which were sent to Dr. Harris a few years since, were said to be the *Ceresa bubalus* (See No. 22) in a letter from him, published at that time in the Journal N. Y. State Ag. Society. Mr. C. informs me the insect he alludes to has no projecting points resembling horns, anteriorly, and is of a uniform pale or pea green color, destitute of any spots or marks, whereas the *bubalus* when alive is deeper green, freckled with whitish dots, and has a pale yellow streak from the horn backwards along each side. The *bubalus*, however, is closely related to this insect and is common upon the fruit and other trees in our yards, and both these species it is probable cut the bark of the plum and other trees in the manner stated above, and we presume the plum weevil also makes a curved incision in the limbs of the plum similar to those we have noticed in the pear.

Mr. Clark has for several years given particular attention to the slits which this tree hopper makes in the bark of the plum and is confident these wounds are the foundation of that most fatal malady the "Black knot." The examinations of this disease which I have made have convinced me that the different insects which writers in our agricultural periodicals have pointed out as producing these excrescences are species which are wholly innocent of the crime laid to their charge. I have watched the growth of the excrescences from their first commencement to their full development, without being able to detect the least indication of an insect in some of them, and in other instances where insects have been present it was plain they were there as a consequence and not as a cause of the disease. The fact, however, that tree hoppers and the plum weevil make incisions in the bark at the same place where this disease shows itself, calls for future investigations, to

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ascertain whether it is not these incisions which lay the foundation for this disease, as Mr. Clark states. Where the incisions are made by tree hoppers the insects will all escape before the swelling in the limb commences, but the slits in the bark will remain, to prove that these insects have been there. Where the plum weevil makes the incisions its larvæ will be present in the excrescence; and this will account for the fact long ago published by Prof. Peck, that he had bred the plum weevil from these excrescences, and hence inferred it was this insect which caused this disease.

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The MAY BEETLE a large thick-bodied chestnut or black beetle about the middle of May eats the leaves of this and the cherry tree. See No. 75.

The ROSE-BUG, a smaller buff yellow beetle also feeds upon them the last of June. See No. 50.

The GRAPE-VINE FLEA-BEETLE, No. 128, sometimes eats numerous small holes in plum leaves also. A young plum tree in my yard had its leaves nearly all destroyed by this insect, every summer, for many years in succession, and other trees near this were more or less injured. Dusting the leaves with caustic and bitter powders proved to be of little if any benefit. At last I resolved to give this unfortunate tree a respite from its enemies, for one season at least, and accordingly picked off and crushed in my fingers every insect that could be found upon it. They were less active after sunset, and with a sudden dart one or two could be caught between the thumb and finger upon almost every leaf. From fifty to two hundred were thus killed daily, for a week or longer, and the hunt was persevered in as long as any insects could be found. This treatment was even more successful than I anticipated, for I have never seen a flea beetle upon my plum trees since that season.

65. PLUM SPHINX, *Sphinx drupiferarum*, Smith and Abbott. (Lepidoptera. Sphingidæ.)

A large cylindrical apple-green worm with a curved violet-blue horn on the hind end of its back, and along each side seven

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oblique white streaks margined with violet upon their upper sides, the head with a white stripe on each side. The pupa under ground, giving out the moth the following June, which hovers about flowers at dusk, resembling a humming bird in its motions; its fore wings measuring from 3.20 to 4.50 when spread; half their surface occupied by a broad dark brown band extending from their inner margin to the tip, in which are about five slender oblique coal-black streaks; the space forward of this band pale reddish gray or ashy clouded with hoary white, and having near the middle a blackish crescent crossed by a long very slender black line; its abdomen gray with a black stripe along the middle, and the sides black with a row of white spots.

The CECROPIA EMPEROR MOTH, No. 33, a large pea green worm with two rows of small yellow prickles on the back and blue ones on the sides, is occasionally met with on the plum.

66. UNICORN PROMINENT, *Notodonta unicornis*, Smith and Abbot. (Lepidoptera. Notodontid.

In August and September, a worm eating a notch in the side of the leaf, often of the exact length of its body, and placing itself in this notch, with the humps of its back resembling the teeth along the edge of the leaf, eventually consuming all the leaf but a small portion of its base; the worm brown like a faded leaf, with its second and third rings leaf green, its head large, and on top of the fourth ring a long horn-like protuberance; growing to 1.25 in length; forming a cocoon on the ground under fallen leaves; the moth appearing in July; its fore wings light brown with patches of greenish white and many dark brown lines, the hind margin white and near the inner angle a small white and two black dashes. Width 1.25 to 1.50. See Harris's Treatise, p. 327.

67. WAVED TUSsock MOTH, *Trichetra opercularis*, Smith and Abbot. Lepidoptera. Arctiidae.)

A caterpillar with brownish evenly shorn hairs rising to a ridge along the middle of the back and sloped off on each side like the roof of a house; making a tough oval cocoon in September, which is fastened to the side of a twig, its top opening by a flat

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circular lid, the moth coming from it the following July. This moth is most readily distinguished by the fine prostrate curled hairs covering its fore wings and arranged in regular waves running as it were from the base to the tip. Its body and legs are also very hairy and at the tip of the abdomen is a tuft of long soft hairs forming a bushy tail. It is of a straw yellow color with the fore wings more or less dusky on the outer margin, and the feet and orbits of the eyes black. The fore legs are often black on their anterior side and sometimes the face is also black. Width 1.20 to 1.80. I have never met with this in New-York and it is omitted in the second edition of Dr. Harris's Treatise, but it appears to be common at the south and west. The *Sparshalli* of Mr. Curtis can scarcely be distinct from this somewhat variable species, and I suspect Mr. Stephens (List Brit. Mus.) is in error in giving that as an Australian insect and that Boisduval was correct in regarding it as North American. Mr. Westwood's generic name *Trichetra* was published the year before Dr. Harris's name *Lagoa*.

AMERICAN VAPORER MOTH. A slender pale yellow caterpillar, its head and two little knobs on its back bright coral red. See No. 32.

The APPLE TREE CATERPILLAR No. 28, and the FALL WEB WORM No. 88, frequently place their cobweb-like nests on plum trees.

The CANKER WORM. A measure worm eating holes in the leaves in June. A gray soft hairy wingless insect crawling up the body of the tree early in spring. See No. 38.

SLUG WORMS. Slimy blackish worms in June and July, eating the green parenchyma and leaving the veins entire. See No. 92.

68. PLUM-LEAF APHIS, *Aphis Prunifoliae*, Fitch. (Homoptera. Aphidæ.)

Puncturing the leaves and sucking their juices, causing them to become wrinkled and distorted; a black shining plant-louse with a pale green abdomen. Length 0.14. See Transactions, 1854, p. 826.

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69. SADDLED LEAF-HOPPER, *Bythoscopus clitellarius*, Say. (Homoptera. Tettigoniidæ.)

A small cylindrical slightly tapering leaf-hopper, 0.20 long, black or dark brown, with a bright sulphur-yellow spot like a saddle upon the middle of its back, a band forward of this and also the head and under side pale yellow, the forehead with two black dots. This probably punctures and sucks the juices of the green succulent twigs as well as the leaves, but I have particularly noticed it standing upon the fruit stems with its beak inserted therein, extracting the fluids which should go to swell and perfect the fruit. And it would thus seem that these leaf-hoppers, like many other insects, are actuated by a spirit of pure malevolence in making their attack upon that part of the plant where they will do us the most injury, when they might nourish themselves equally as well in places where their harm would be slight.

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70. PLUM WEEVIL, or CURCULIO, *Conotrachelus Nenuphar*, Herbst. (Coleoptera. Curculionidæ.)

Making a small crescent-shaped incision upon the side of the young fruit and dropping an egg therein, from which comes a small white footless worm or grub which bores in the fruit, causing it to become diseased and gummy and to drop from the tree, the worm when full grown entering the ground and in three or four weeks coming out in its perfect state, when it is a short thick rough beetle, shaped somewhat like a pear, and with a long snout like an elephant's trunk hanging down in front, its color dark brown with a broad white or yellow band on the hind part of the wing covers, and small spots of black, white and yellow. Length 0.15 to 0.25. For the winter residence of this weevil, see insects of pear limbs, p. 349. See Harris's Treatise, p. 66.

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8. THE CHERRY.—*Cerasus vulgaris*, et al.

Though some of the insects noticed below have only been observed upon our wild cherries, *Cerasus serotina* and *Virginiana*, there is little doubt but the same will at times invade the garden cherry; and all the trees of this genus are so closely related to each other that, for a purpose like the present, it appears unnecessary to divide them into different heads.

AFFECTING THE TRUNK AND LIMBS.

71. DIVARICATED BUPRESTIS, *Dicerca divaricata*, Say. (Coleoptera. Buprestidæ.)

A flattened worm resembling a tadpole and otherwise similar to the Apple Buprestis, No. 3; mining in the sap wood under the bark; the perfect insect appearing the last of June and through July, running up and down the trunk of the tree in the sunshine; a thickly punctured snapping beetle, having a coppery lustre, its wing covers striated and freckled with small blackish spots, their ends narrowed, drawn out and spreading slightly apart, the tips blunt and as though broken off. Length 0.70 to 0.90. The beech is undoubtedly the original residence of this insect, and wherever a dead tree of this kind occurs some of these beetles will almost always be found upon it on sunny days in midsummer. I know not why, in the lately published Catalogue of F. E. Melsheimer, Kirby's generic name *Stenuris* is preferred to that of Eschscholtz, whilst on a following page precedence is given to one of the generic names of the latter author over one proposed by Mr. Kirby. As Eschscholtz's names for these genera were published several years anterior to those of Kirby I have retained them. For some further items respecting this insect see Harris's Treatise, p. 42.

The ROUGH OSMODERMA No. 7, and the HORN-BUG No. 6, occur in their larva state in old decaying cherry trees, and in their dead stumps one or both of these grubs will be found in profusion and of all sizes.

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72. SPOTTED HORN-BUG, *Dynastes Tityus*, Linn. (Coleoptera. Scarabæidæ.)

In old decaying trees, a very large grub, like those of the last named species, producing a beetle two inches in length, of a shining pale olive color, its wing covers with round black spots or dots, the males having the middle of the thorax prolonged forwards in a long black horn which is hairy along its under side and commonly notched at its tip, as if to receive the sharp point of another similar horn which curves upwards from the crown of the head; two other horns between these, short and sharp pointed, one upon each side. This large beetle is frequently met with at the south and I have specimens of it from Pennsylvania, but know not of its ever being found in New-York. Mr. Say mentions possessing a specimen having the wing covers chestnut brown and without spots, and I have a female in which the whole of the thorax is black. But probably the most remarkable specimen which has ever been discovered was captured west of Arkansas by Rev. R. M. Loughridge and presented to the entomological cabinet of the N. Y. State Agric. Society. This is a male having the left wing cover black and without spots, whilst the right wing cover and thorax is pale olive yellow.

73. DOG-DAY CICADA, *Cicada tibicen*, Linn. (Homoptera. Cicadidæ.)

In August and September, wounding the small limbs to deposit its eggs therein, a large black fly with four clear glassy wings having a green rib, its head and thorax with olive green spots and marks, and its under side coated with a white meal-like powder. Length 1.60 to 2.00. The *pruinosa*, Say, is this same species, with the white mealy powder not rubbed off as it frequently is in old specimens. The *canicularis*, Harris, are merely small sized individuals of the *pruinosa*. The valves at the base of the abdomen in the males vary in their length both in large and small individuals, and therefore furnish no valid mark, as Dr. Harris supposed, whereby his species can be distinguished. The specimens found in the State of New-York are of the smaller size, this being the northern limit of the geographical range of this species. It extends from hence south to Brazil. In Surinam, according to Madam Merian, it is most common in the coffee plantations, the trees of which are sometimes killed by the wounds which the

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female makes in the limbs to deposit her eggs. With us it appears to resort to the maple more than any other tree, and in forests and frequently in the trees around our dwellings the loud shrill note of the male is heard every clear sunshiny day throughout dog-days. See Harris's Treatise, p. 190.

74. CHERRY BARK-LOUSE, *Lecanium Cerasifex*, new species. (Homoptera. Coccidæ.)

In June, adhering to the bark upon the under side of the limbs of the wild black cherry, a hemispherical shell nearly the size and shape of a half pea, of a black color more or less mottled with pale dull yellow dots, covering a mass of minute eggs the lice from which spread over the bark and subsist upon its juices. I find no bark-louse indicated by authors as occurring upon the cherry in Europe. We in this country have two insects of this family infesting trees of this kind, the one now mentioned and the following.

75. CHERRY SCALE INSECT, *Aspidiotus Cerasi*, new species. (Homoptera. Coccidæ.)

In winter, on the bark of the choke cherry, little roundish white wax-like blisters, scarcely perceptible to the naked eye, containing beneath them in an open cavity a cluster of minute dull red or resin-like eggs. The history and habits of this species will be analogous to that of the Apple bark-louse, No. 15.

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76. MAY BEETLE, *Lachnosterna fusca*, Frohlich. (Coleoptera. Melolonthidæ.)

About the middle of May gathering by night upon the trees and eating the leaves, sometimes in such numbers as to wholly strip the foliage from the choicer varieties; a thick-bodied chestnut-brown or black beetle nearly an inch long, its legs of a lighter tawny yellow color and its breast coated with pale yellowish hairs.

The larva of this insect lives under ground and is most injurious to meadows and pastures. It has been very destructive the present year in some parts of our State, and enquiries have been addressed to me for information respecting it and the best remedies

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for it. An article in reply to these enquiries is published in the *Genesee Farmer* for August of the present year (vol. xviii, p. 249), the substance of which may here be repeated with some additions, as this is one of our most pernicious insects, and the measures for subduing it which I have to suggest are regarded as important.

This insect is commonly called the May bug, though the name May beetle will be a more definite and correct designation for it. The custom of calling almost all insects "bugs," is often denounced as being an Americanism; but this, like many others of these reputed Americanisms we obtained from our father-land. Thus the cockchaffer, the European analogue of this insect, we see is termed the May *bug* in the English translation of Kollar's Treatise—a clear evidence that we have obtained the name which we give to our insect from England. And in several other instances, the name *bug* will be met with in British publications, applied to beetles. Still, every person intelligent upon this subject is aware it will be an improvement in our language to give the name *beetle* to all hard, crustaceous-coated insects, which belong to the order COLEOPTERA, and restrict the name *bug* to the order HEMIPTERA, or those flat-backed insects which emit the same disgusting scent as the well-known bed-bug.

This insect is also frequently termed "horn-bug," being confounded with a larger, perfectly smooth and more flattened beetle, (No. 6, *Lucanus Capreolus*, Linn.,) which comes out later in the season. It is thus called more particularly, when, like the true horn-bug, it flies in at the open windows of our dwellings upon warm evenings, which both of them frequently do, to the great annoyance and even terror of the female portion of the household. Neither of these insects, however, can harm our persons; and when they intrude into my room in this manner, I find the quickest way to dispose of the pests, is with my fingers to hold their heads in the candle a moment or two, and then toss them out the window.

The name "field grub" has also been given to the larva of this insect in some neighborhoods where its destructiveness has brought it into notice and it was not known that it subsequently turned into a beetle.

As this is one of our most important noxious insects and will be frequently mentioned in the agricultural publications of this

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country, it is a matter of no small moment that its scientific name be correctly ascertained and well settled. Some confusion at present exists upon this point, among different writers. This discrepancy has chiefly arisen from a most disingenuous statement made by Dr. Harris, in both editions of his Treatise, page 28 and 26, where he says the genus *Phyllophaga* was "proposed by me in 1826. Dejean subsequently called this genus *Ancylonycha*." Now the number of the Massachusetts Agricultural Repository in which Dr. Harris's essay appears (vol x, pages 1—12) bears the date of July 1827! and the name *Phyllophaga* is there merely suggested for this insect and its kindred, without any statement of the marks by which the group thus designated can be recognized. In this same year (1827) also, a distinguished British entomologist, Rev. F. W. Hope, published the first part of his Coleopterist's Manual, in which this same group is distinctly set apart and clearly characterized, and the name *Lachno-steria* (i. e. hairy-breasted) is given it. This name, therefore, is evidently the one which the established rules of scientific nomenclature will give to the genus to which our insect belongs. Dejean's name *Ancylonycha* mentioned above by Dr. Harris, not having been proposed until several years later.

This insect has hitherto been generally entered under the specific name *quercina*, but Dr. LeConte has recently ascertained that nearly ten years before Weber bestowed this name upon it, Frohlich, a German naturalist, had in the year 1792 described it under the name *fusca*.

We thus reach the conclusion that *Lachnosterna fusca*, a term meaning blackish hairy breast, is the correct technical name of our common May beetle, which has so often hitherto been called *Phyllophaga quercina* in our agricultural periodicals.

The May beetle is a glossy thick-bodied insect, 0.80 to 0.90 long and about half as broad. It varies in color from chestnut-brown to black, and this difference of color does not appear to be owing to age, for it is found in newly hatched beetles before they have come forth from the ground. The head is commonly darker colored than the thorax, is closely punctured, and its anterior edge is thin and turned upward, with a concavity but not an angular notch in its middle. The feelers and antennæ are somewhat paler yellow than the legs, which are polished tawny yellow. The punctures upon the thorax are coarse and farther apart than on the head. The wing covers though glossy and

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shining are rough from being covered with shallow indented points the edges of which are wrinkled, and running lengthwise upon each wing cover is three or four raised straight lines. The breast is covered with glossy fine yellowish gray hairs.

This species presents several varieties. Commonly the thorax is a little narrower than the wing covers, whereby the general shape approaches to that of an egg with its small end forward. But sometimes the thorax is broader equaling the width of the wing covers and giving the individual a form nearly cylindrical. The sides of the thorax are regularly rounded, but sometimes a specimen may be found having the lateral margin slightly angular in the middle. Sometimes the punctures upon the thorax or those upon the wing covers are larger and more distinct than usual. By different authors several distinct species have heretofore been made out of these varieties of this insect.

In its larva state it is a thick soft white grub with a brownish head and with the hind part of its body curved downwards and more or less forward under its breast. It is several years in attaining its growth, so that grubs of different sizes will be found in the ground at the same time. When full grown it is almost as thick as the little finger. These grubs feed upon the roots of grass and other plants, which they cut off a short distance beneath the surface; and when they are numerous they advance under ground like an army, severing the turf as smoothly as though it were cut with a spade, so that it can be raised up in large sheets and folded over or rolled together like a carpet. Often from a dozen to twenty grubs will be exposed in every square foot when the turf is thus raised. Large patches of this kind will occur in the middle of a meadow or pasture, every blade of the grass being brown and dead.

Early in spring, in spading or plowing the ground, these beetles are frequently exhumed, or sometimes in turning over a large stone one of them will be found beneath, lying in a smooth cavity or little round hollow in the dirt, like a chicken in its shell. This cavity or cell is formed by the grub in the preceding autumn. Turning itself around and around, it presses upon and compacts the dirt and moulds it into this cell for its winter residence; and in this cell it changes first to a pupa, in which the legs and wing-cases of the insect are seen in their rudimentary state, and afterwards to a beetle, such as we have above described. This beetle lies dormant in its cell until the warmth of the incoming summer

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penetrates the ground sufficiently to awaken it into activity. It then breaks from its prison and works its way out of the ground.

These beetles begin to make their appearance each year about the first of May, and become most numerous in the middle of that month. They are sluggish, inactive, and seemingly stupid in their movements. They repose during the day time, hid in the grass, or any other covert which they find. At dusk they awake and fly about slowly, and with a humming noise, hitting among the leaves of the trees and clinging thereto, and feeding upon them. They are most fond of the leaves of the cherry and plum, which trees they every year injure more or less, and occasionally they congregate in such numbers as to wholly strip them of their foliage, destroying all hopes of any fruit from them that season. An instance of this kind was communicated to me four years since by Milo Ingalsbe, Esq., of South Hartford, at that time President of the Agricultural Society of this (Washington) county. He had seventy plum trees and a number of cherry trees of the choicest varieties, which never gave fairer promise of an abundant yield of fruit than at that time. But a swarm of these May beetles suddenly gathered upon the trees, many of them being then splendidly in bloom, and in two nights, the 15th and 16th of May, wholly stripped them of their foliage, so that many of them were as naked as in winter. With their humming notes, these beetles were flying about the trees every evening until about ten o'clock, when they would settle in clusters of eight, ten, twenty or more, and would thus remain until daylight, when they would tumble down from the trees, flying but little, however, and hiding themselves wherever convenient to stay through the day. These observations are important, showing that between midnight and daylight is the best time for spreading sheets beneath the trees to shake and beat these insects into them. In a subsequent letter, dated June 29th, Mr. I. stated that these beetles had then disappeared from all his trees except an Ox-heart cherry, on which about a dozen were found, this being the choicest variety among his cherry trees—indicating that though seemingly such stupid creatures, they are good connoisseurs in selecting their food. And among his plums, it was the Washington, Jefferson, Lawrence and others of his best kinds which had been attacked with the greatest avidity.

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Apple trees, which were standing alternately with his plum trees, were not in the least molested. Mr. I. has recently informed me that his trees have never been reinvaded by these beetles since that time.

These insects are numerous all over our country. In my own neighborhood they have been common every year, I think, since I first became acquainted with them, more than twenty-five years ago; yet I have here never known the trees to be stripped of their foliage by them, or the turf to be severed by their larvæ, although two or three instances of the latter have been related to me as having occurred in this town, and I have several times heard of the same phenomenon in other places. It appears to be a most singular and remarkable circumstance in the economy of these insects, that, while it is their ordinary habit to live dispersed and apart from each other, they at times become gregarious, both in their larva and their perfect state, multitudes of them assembling together in a flock, and by their conjoined labors utterly devastating what they attack. Some other insects, however, show this same habit. It is only occasionally that the migratory locust of the east, so renowned in story, congregates together in swarms and flies off to a distance. And instances have occurred in which the common red-legged grasshopper, which is scattered about the fields of our own country, has done the same in years when it has been unusually abundant.

The history of our May beetle and its transformations have never been fully observed, but everything known respecting it concurs to show that it is exactly analogous to the cockchafer or May bug of Europe, (*Polyphylla Melolontha*, Linn.,) and occupies the place of that species upon this continent. The grubs of that insect are about five years in obtaining their growth. The beetles pair soon after they come from the ground, and the male lives but a few days. The female crawls back into the ground and there drops her eggs, which are nearly a hundred in number, after which she again emerges, and being now decrepit with age, she feeds but little and dies in a short time.

Among the natural destroyers of our May beetle is the skunk, whose food appears to consist of these insects almost entirely, during the short period of their existence. Some cats will also

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eat them, though I suppose it to be more for sport than food that grimalkin is frequently seen at twilight, stealthily creeping through the grass of the door-yard, and springing upon these beetles as they crawl therefrom to take wing. Our domestic fowls are also very fond of the grubs. But of all the destroyers of these insects, no other animal can vie with the crow, which frequently follows the track of the plow to feed upon the grubs of the May beetle which are turned up thereby.

With regard to remedies we may observe, that in Europe the experience of centuries has failed to discover any efficient measure for destroying a similar insect during the larva period of its existence. And concealed in the ground as these grubs are, it is not probable that any substance can be applied to the soil of sufficient power to kill them without destroying also whatever vegetation is there growing. But where these grubs are so numerous as to sever the roots of the grass and pare the turf, I think there is a measure which may readily be resorted to whereby they may be exterminated. I would recommend the placing of a temporary fence around that part of the meadow or pasture which is so thronged with these grubs, and enclosing a number of swine therein, thus for a while converting the patch into a hog pasture. The propensity of these animals for rooting and tearing up the turf, we are all aware, is for the very purpose of coming at and feeding upon the grubs and worms which are lurking therein; and who knows but this rooting propensity, which has all along been complained of as being the most troublesome and vicious habit which belongs to swine, may after all turn out to be the most valuable and necessary to us of any of the habits with which they are endowed? At all events, it is one of man's greatest achievements to so observe and study the habits and instincts of the lower animals, as to devise ways whereby those habits and instincts, instead of being exerted to his injury, are brought into his service and made to work for his benefit. Therefore do not let us "lords of creation" allow these vile field grubs to rob us of two or three acres of grass without obliging them to give back to us an equivalent for it. Let us have the value of that grass returned to us in the increased size and thriftiness of our swine. I cannot but think these animals, confined upon a spot so overstocked with

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grubs, would in a short time ferret out and devour every one of them, leaving the soil cleansed, mellowed, manured, and well prepared for being immediately laid down to grass again, or for receiving any rotation of crops for which the proprietor may deem the spot best adapted. It should be observed that when cold weather approaches, these worms sink themselves deep into the ground so as to be beyond the reach of frost during the winter, and return back to near the surface again when spring returns; so that when they are severing the roots of grass there will probably be none deeper than hogs are accustomed to root. It will be interesting to know how long a given number of swine will be occupied in cleansing an acre of ground containing from twelve to twenty of these grubs in every square foot. And I earnestly hope those who have lands which are devastated in the manner spoken of, will try the experiment which I have now proposed, and will make the result known to the public, whether it be successful or otherwise.

When these grubs have completed their growth, and come abroad in their perfect state, another opportunity is presented for destroying them and preventing their future increase. Every year when the middle of May is approaching, cherry and plum trees should be inspected each evening, particularly our choicest varieties of these trees, to ascertain if the May-beetles are collecting in numbers upon them; and if they are, they should immediately be shaken off upon sheets spread beneath the trees, and emptied into bags or covered pails, and should be killed by immersing them in boiling water, or pouring this upon them; after which they may be fed to the swine and poultry. Many years ago a writer in the New-York Evening Post stated that trees could in this manner be entirely freed from these beetles in a very few evenings. Trees from which two pailsful were collected the first evening furnished a much less number upon each succeeding night, until the fifth, when only two beetles could be found upon them.

The ROSE-BUG, No. 50, a buff yellow beetle smaller than the preceding, eats the leaves, the last of June.

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77. VIOLACEOUS FLEA-BEETLE, *Crepidodera violacea*, Melsheimer. (Coleoptera. Chrysomelidæ.)

From the middle of May till August or later, eating numerous small holes in the tender new leaves at the ends of the limbs, a brilliant coppery, violet or greenish black flea-beetle, 0.10 long, its under side black, its antennæ and legs dull pale yellow with the hind thighs black. It sometimes merely gnaws a little round hollow in the under side of the leaf, leaving the thin transparent skin on the upper side of the leaf entire.

LARGE YELLOW BUTTERFLY. The larva occurs on the cherry the same as on the apple. See No. 36.

78. GLAUCOUS BUTTERFLY, *Papilio glaucus*, Linn. (Lepidoptera. Papilionidæ.)

I have not met with this butterfly in the State of New-York, but a larva identical with that of this species as figured by Abbot, I have repeatedly noticed upon the garden cherry and also on the oak and ash, in August, resting day after day upon a thin cobweb spun over the upper side of a particular leaf. The larva is like that of the large yellow butterfly, No. 36, with several blue or violet dots superadded, namely, one above each of the eye-like spots, four in a transverse row forward of the yellow band, a similar row on each of the three rings forward of the last, and a row lengthwise low down upon each side. The butterfly is black, 4.75 to 5.50 across its wings, and may be recognized by a row of small oval spots of a pale yellow or white color extending across the fore wings near their hind edge.

79. PURBLIND SPHINX, *Smerinthus myops*, Smith and Abbot. (Lepidoptera. Sphingidæ.)

In August, a large cylindrical apple-green worm with a curved horn at the end of its back, two rows of rust red spots, and along each side six oblique yellowish streaks; passing the winter under ground, and in July changing to a moth which may be distinguished by its hind wings, which are dark snuff brown, their inner half light ochre yellow inclosing a large round black spot having a pale blue centre. Width 2.50. Rare. See Silliman's Journal, vol. xxxvi, p. 291.

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The CECROPIA EMPEROR MOTH, No. 33. Two young worms which I placed on a garden cherry fed freely thereon, remaining till they were full grown, and I doubt not this species sometimes occurs naturally upon this tree.

80. PROMETHEA EMPEROR MOTH, *Attacus Promethea*, Drury. (Lepidoptera. Bombycidæ.)

In August, a large cylindrical, or when at rest a tapering pale greenish-yellow worm coated with a white bloom except at each end, with six rows of black dots or small prickles, the two upper ones on the second or third rings larger, resembling little horns of a bright red color like sealing wax, and on top of the ring forward of the last a single bright sulphur yellow protuberance; forming its cocoon inside of a rolled leaf the stem of which is tied to the limb with silken threads; the moth coming from it the last of June, its wings measuring from 3.60 to 4.40, sooty black, in the female brownish red, bordered behind with drab gray in which is a wavy black line having forward of it on the hind wings a row of round black spots, in the female deep red, the inner ones more or less united.

As Dr. Harris (Treatise, page 300) mentions the cocoons of this insect as sometimes occurring on the cherry it will be inferred that it feeds upon the leaves of this tree. And I introduce this species here, to observe that I have reason to think the statements which have hitherto been made respecting the vegetation on which this insect subsists, are perhaps erroneous, writers having probably taken it for granted that it fed upon the trees on which they have found its cocoons. This is a subject of more than ordinary importance, since it has been shown upon a preceding page that this moth and the Cecropia are most intimately related to the Arrindy silk worm; and further experiments should be instituted to ascertain whether the silk of these moths of our own country does not possess similar durability and strength with that of the East India worm, and whether these insects are not susceptible of being turned to a valuable account.

All the statements hitherto published point to the sassafras as the tree on which the larvæ of the Promethea moth chiefly subsist. Now for fifteen years past a sassafras has been growing in

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my yard without one of these worms ever appearing upon it; whilst upon an ash tree standing beside this sassafras and not three feet distant from it there has repeatedly been a family of these worms. Certainly if the sassafras were the favorite food of this species some of these worms would have been placed upon it. They have also occurred upon ash trees in other parts of my grounds, and upon no other tree have I ever met with them. Last year on the 18th of July a dozen young worms were found in a cluster upon the under side of a leaf of the ash tree above alluded to, and upon an adjacent leaf of the same stalk were the shells of the eggs from which these worms had come, resembling little cups or hemispheres of clear glass. The eggs were in contact with each other on the under surface of the leaf, and this leaf had been partly consumed by the worms when they first came from their shells. I continued to notice them daily for about a week, when they all disappeared, probably mounting high into the tree, and I could discover no traces of them afterwards. Upon the fall of the leaves in autumn I was disappointed to find no cocoons upon this tree; but upon a lilac growing against the side of the house four rods distant two dozen cocoons occurred. The worms which formed these cocoons could not have fed upon the lilac without being discovered, and I could not avoid the conclusion that they had been reared upon the ash tree, and when fully grown had migrated to this bush, though in doing so they passed several other lilac bushes, and selected this, perhaps, because growing against the side of the house it would be less apt to be visited by birds than those standing in the open yard. But this precaution did not save them. The last winter being unusually long and severe, our winter birds were obliged to forage more assiduously than usual, and before spring every one of these cocoons were perforated and its inmate destroyed. In other instances I have noticed these worms remaining till they were mature, upon small sprouts of the ash where they could be observed daily. From all these facts I am confident the ash is their favorite food. But when ready to spin their cocoons it is too laborious a task for them with their silken threads to tie the long leaf stalks of this tree to the limbs from which they grow, and I have very seldom known a cocoon to be placed upon this tree.

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Having finished feeding, the worms invariably repair to other trees having tough leathery leaves which will form a thick substantial mantle around the cocoon, and having short stems that can readily be tied to the twigs from which they grow. We cannot but admire the intelligence which they manifest in this procedure. Authors mention the sassafras, cherry, poplar, Azalea, Cephalanthus, snow-drop (*Halesia*) and bay, as the trees and shrubs on which the cocoons occur; but in this district it selects the lilac in preference to any of these. Few winters pass but that some of these cocoons may be seen on the lilacs in all our yards, and sometimes fifty or more will be observed upon a single bush. In the city of Albany they are equally as common upon the lilacs as in the surrounding country. But as the other insects of this family feed upon several different trees and shrubs, it is not probable that this is confined to one kind of food. Being found, however, in Eastern New-York, so uniformly if not exclusively upon the ash, and its cocoons upon the lilac, it is remarkable that neither of these trees has ever been mentioned by writers, in connection with this most interesting and beautiful moth.

81. IO EMPEROR MOTH, *Saturnia Io*, Fab. (Lepidoptera. Bombycidæ.)

In August, a thick apple green worm, 2.50 long, covered with clusters of prickles having black tips and stinging like nettles if touched, and along each side an orange or brick red stripe freckled with white dots and edged on its lower side by a white stripe; forming a cocoon on the ground under dead leaves; the moth appearing in June, its hind wings bright yellow, their inner margin purplish red and on their middle a large black eye-like spot having a pale blue centre in which is a white streak; the fore wings yellow in the male, purplish brown in the female. Width 2.70 to 3.50. I have met with this on the wild black cherry and on the thorn. From six to nine worms often occur upon the same tree. They commonly eat all the leaves from the end of particular limbs, leaving only a short stump of the leaf stalk. See Harris's Treatise, p. 304.

82. MISSISSIPPI BUTTERFLY, *Limenitis Misippus*, Fab. (Lepidoptera, Nymphalidæ.)

In June and July, a thick bodied worm 1.75 long, olive green varied with white, the second ring humped and with two long

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blackish prickly horns, a row of small white prickly warts along each side of the back, and the head white and covered with small prickles; its pupa hanging with its head downwards, on the under side of a limb or leaf, in a week or ten days giving out a butterfly having bright tawny orange wings with black veins and margins and a narrow black band across the middle of the hind pair, the black border having a single row of white dots. Width 2.75 to 3.40. Abbot says the larva feeds on different species of cherry, but it is much oftener met with on willows, and I have also found it on poplar.

83. CLYTON BUTTERFLY, *Apatura Clyton*, Boisduval. (Lepidoptera. Nymphalidæ.)

A worm nearly 1.05 long and as thick as a goosequill, thickest in the middle, pale green with four light greenish yellow stripes, the top of its head having two yellow spines with branching prickles; its pupa hanging from the under side of a limb with its head downwards; the butterfly with blackish brown wings, tawny orange on the basal half of the fore pair, beyond which is two rows of small olive yellow spots and near the hind edge a narrow yellowish band broken towards its inner end. Width 2.20. I have never met with this in the State of New-York. It occurs through the southern States on the cherry and other trees of the same family.

84. AMERICAN LAPPET-MOTH, *Gastropacha Americana*, Harris. (Lepidoptera. Bombycidæ.)

The latter part of summer, a cylindrical worm when feeding by night, but by day broad and flat, pressed to the limb and resembling a tumor of the bark, 2.50 long, ash-gray varied with whitish spots and having two transverse velvety red streaks anteriorly; its pupa in a cocoon also resembling a slight swelling upon the limb, of the same colors with the bark; the moth appearing in May, its wings deeply notched along their hind and inner margins, reddish brown, both pairs crossed by a broad whitish band which has a wavy dark reddish line upon each side. Width 1.50 to 1.90. See Harris's Treatise, p. 293. [NOTE.—This is the same with No. 30. The repetition was not discovered till it was in type, too far to cancel the error,]

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85. HAG MOTH, *Limacodes pithecium*, Smith and Abbot. (Lepidoptera. Arc tiidæ.)

In August and Septemoer, a flattened dark brown singular looking worm of an oblong and nearly square form, the sides of its body prolonged outwards into eleven tooth-like processes, the three middle ones of which are longer with their ends curved backward, growing to nearly an inch in length, its pupa state passed in a small cocoon fastened to a limb; the moth dusky brown, its fore wings varied with pale yellowish brown, and crossed by a narrow wavy curved band of this color, edged on its hind side near the outer margin with dark brown, and having near the centre a light brown spot. Width 0.95 to 1.25. See Harris's Treatise, p. 324.

86. DRY LEAF MEASURE-WORM, *Geometra? siccifolia*, new species. (Lepidoptera. Geometridæ.)

A measure worm in many respects like the preceding, but more narrow and flattened and having a marked resemblance to a dry withered leaf or the brown scraggy fragment of a dead twig, may frequently be met with some years, in August and September, most commonly upon choke cherry bushes. It is 0.80 long and a dull dark umber brown color, sometimes of a paler yellowish shade, and with a blackish streak along the middle of its back. The three middle segments are nearly double the width of the others, their sides being prolonged obliquely forwards and upwards in thin flat triangular projections having their tips blunt or slightly notched, and commonly ending in two little sharp teeth. The next segment back of these is also slightly prolonged outwards. On the top of the segment next to the last are two little horns projecting upward. Adhering to a twig with its four hind feet, it remains motionless with its body slightly bent and turned upward, and if knocked to the ground it lies perfectly still. No one from its appearance, would suspect it to be anything possessed of life. The latter part of September it draws two or three leaves together tying them with silken threads, and spins its cocoon within them; but I have not yet succeeded in obtaining the moth from these cocoons.

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The ROSACEAN TORTRIX, No. 46, is a common worm upon the cherry

87. CHERRY-EATING TORTRIX, *Lozotania Cerasivorana*, new species. (Lepidoptera. Tortricidæ.) Plate ii, fig. 3.

In July, tying the leaves together with silken threads; when numerous, living in societies and forming a large nest, drawing all the twigs and leaves of a particular limb together; oftenest seen on the choke cherry, but occurring also on the garden cherry; an ochre yellow worm with the head, neck, hind end and feet black, and a few fine hairs from smooth shining dots; forming its pupa in the same nest; the moth broad and flat when at rest, the outer edge of its fore wings being strongly rounded towards the base and straight from the middle to the tip, these wings with irregular wavy bands alternately of bright ochre yellow and pale leaden blue, the yellow bands often varied with rusty or blackish atoms forming darker spots, the most conspicuous one of which is placed on the outer margin near the tip, and from this spot a broader ochre yellow band extends towards the hind margin forward of its middle and curves thence to the inner angle; hind wings and all beneath pale ochre yellow. Width 0.75 to 1.10. Like others of this group this moth varies greatly, the marks on its fore wings being confused and indistinct or wholly obliterated in old rubbed individuals. It may always be known, however, from the other moths related to it, by its bright yellow color, in connection with its size and the shape of its fore wings. None of the described insects of this genus appear to have hind wings of so pure yellow without any smoky or dusky shade.

88. FALL WEB WORM, *Hyphantria textor*, Harris. (Lepidoptera. Arctiidae.)

In August and the fore-part of September, forming a large thin cobweb-like nest on the end of a limb and eating all the leaves in and around it; smallish caterpillars living together in a society, their color pale yellow, with a broad black or blackish stripe upon the back and another beneath, thinly clothed with whitish hairs growing from smooth orange yellow and black dots, the head and feet black; the worms of the same nest varying greatly



Currant borer



Oak pruner



Cherry Tortrix.



Buffalo tree hopper.



Thorn-bush tree hopper.



Spotted Psephenus



Large tree bug



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in size and colors; growing to about an inch in length and then dispersing and spinning their cocoons in crevices of the bark and similar sheltered situations; the moth appearing the fore part of the following summer, a milk white miller without any spots or dots on its wings, its fore thighs tawny yellow in front and the anterior feet alternated with black and white on their fore side. Width 1.25 to 1.35. This is quite common some years, and occurs upon the ash, willow, and several other trees. See Harris's Treatise, p. 276.

A Brazilian moth very similar to that of our Fall web worm, has been sent me from Bahia, by my friend A. de Lacerda. In this the basal part of the outer edge of the fore wings and the feet are blackish, and the four anterior shanks are orange yellow on their outer side with a blackish spot on their base and another on their middle. Its expanded wings measure 1.50. Its pupa is white with the abdomen flesh colored and is beautifully variegated with symmetrical black stripes and spots, from which circumstance, as I meet with no description of this species, I have named it in my collection, *Hyphantria pictipupa* or the Painted puppet.

89. YELLOW-NECKED ERMINE MOTH, *Hyphantria collaris*, new species.

A moth closely related to the preceding and doubtless possessing the same habits, has been sent me from Mississippi, and probably occurs throughout the southern states. It is milk white and glossy, its head, neck, base of the outer edge of the fore wings and the anterior hips are pale ochre yellow, and its feet pale brown. Width 1.35.

90. DOTTED ERMINE MOTH, *Hyphantria punctata*, new species.

A worm similar to that of the Fall web worm and possessing the same habits, producing in June a milk white miller having a continuous black stripe on the fore side of its anterior feet and shanks, their thighs and hips being yellow in front, and the fore wings having a black central dot, and in the males a row of small blackish spots extending from the middle of the inner margin to the tip. Width 1.65 to 2.00. This is frequently met with in our district, though much less common than the Fall web worm.

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91. SPOTTED ERMINE MOTH, *Hyphantria cunea*, Drury.

Caterpillars similar to those of the Fall web worm, and like it forming a large cobweb-like nest on the ends of the limbs of the wild cherry, willow and other trees in autumn. The moth a milk white miller with its anterior feet black on their fore side and alternated with black and white on their hind side. Its anterior shanks are black in front and the thighs and hips orange yellow. In the male the fore wings have numerous small black spots and dots which do not appear in the other sex. Width 1.30 to 1.60. The males vary greatly in the number of their spots, and frequently there is a curved black band upon the middle of their fore wings cut across only by the white veins. This species, named in allusion to its fore wings *punctatissima* or many dotted, by Smith and Abbot, and *cunea* or wedge spotted, by Drury, was described by the latter from specimens captured in the vicinity of New-York city, and S. Calverley, Esq., of Brooklyn, to whom I am indebted for a suite of specimens showing its several varieties, informs me it is quite a common insect there. But I have no knowledge of its occurrence anywhere north or west of the Highlands.

The APPLE TREE CATERPILLAR, No. 28,

VAPORER MOTH, No. 32,

CANKER WORM, No. 38,

APPLE TORTRIX, No. 40, and

PALMER WORM, No. 42, may all be found feeding upon the leaves of the cherry.

92. CHERRY SLUG WORM, *Selandria Cerasi*, Peck. (Hymenoptera. Tenthredinidæ.)

In June and July eating the upper surface of the leaves and leaving the veins and skin of the under side entire; small shining slimy slug worms of an olive brown and blackish color, dull yellow beneath, tapering and swelled anteriorly, resembling young tadpoles; several often feeding upon one leaf; maturing in four weeks and then burying themselves under ground through the winter; changing finally to a small glossy black fly with four

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transparent wings tinged with smoky which forms a dusky cloud across the middle of the fore pair, its four anterior legs and the knees of the hind pair dirty yellow or clay colored, their thighs blackish. Length 0.22. See Harris's Treatise, p. 419.

93. CHERRY ABIA, *Abia Cerasi*, new species. (Hymenoptera. Tenthredinidæ.)

I only know this and the following species from specimens bred from cocoons found attached to the limbs of the wild black cherry, which is a sufficient evidence that their larvæ subsist upon the leaves of this tree. Like other larvæ of the same genera, they will be twenty-footed worms, having two pairs of pro-legs more than the usual number, and they eat the edges of the leaves. The cocoons of both these insects are cylindrical with rounded ends, and are of a tough firm texture, resembling coarse brown paper. Those of the cherry *Abia* are 0.80 long by 0.38 in diameter. Two of these cocoons were met with last March, upon a low bush within three feet of the ground. One of them had been perforated by birds and its inmate destroyed; the other on being brought into a warm room hatched within a fortnight, indicating that with the first warm days of spring these flies come abroad. They cut off one end of the cocoon smoothly, to make their exit from it, the severed end resembling a little lid, some of the loose threads upon the outer surface of the cocoon forming a hinge whereby this lid can be opened and shut. The fly is black with the abdomen and thighs blue black and the feet and tips of the shanks pale yellow. Its thorax is thinly covered with pale grayish yellow hairs, and its wings are transparent, smoky yellowish, with black veins, those on the basal third pale yellow. Length 0.60, to the tip of the wings 0.80; width 1.35.

The species of this genus are very few, and little is known of their habits. This is the first one, I believe, which has been found in this country. It resembles a *Cimbex*, the antennæ being short, with a round knob at their ends shaped like an egg with its large end outwards, and in the specimen before me there are four joints to this knob, and four in the stem which precedes it, this being one joint more than the normal number in this genus.

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94. BLACK-CALFED SAW-FLY, *Nematus suratus*, new species. (Hymenoptera. Tenthredinidæ.)

This comes from a cocoon 0.30 in length by 0.14 in diameter. The fly eats off the end of its cocoon to make its exit therefrom. It was met with at the same time with the preceding species, and was a week later in hatching. The fly is black with four transparent slightly smoky wings, its mouth lurid white as is also a cloud-like spot on the shoulders, the edges of the abdominal segments, and the legs, the four anterior thighs being black upon their under sides and the hind pair wholly black except at their bases. Length 0.25, to the tip of the wings 0.30.

A surprising degree of intelligence was manifested by this insect, in the situation which it selected for its cocoon. Upon a small limb growing perpendicularly upward the moth of an apple tree caterpillar had placed its belt of eggs, coated over with gum in the usual manner, and immediately above this a small tender leaf was growing. The worm spun its cocoon between this belt of eggs and the leaf above it. The frosts of autumn subsequently wilted this leaf and the rains saturating it weighed it downward, causing it to adhere like a wet cloth to the belt of eggs, the gum upon which afterwards drying glued the leaf securely in this position. And thus the stem of the leaf came to form a band or loop over the cocoon, holding it securely in its place. It is truly wonderful how the worm which formed this little thimble-like cocoon could have known that this spot was so well adapted for its wants. Had it previously crawled over these caterpillar's eggs when they were wet, and thus discovered that their gummy covering then became soft and adhesive? And had it the intelligence to foresee that the leaf growing immediately above them would in a short time wither and lop downwards and become firmly glued to the surface of this gum? It would so appear, from the fact of its placing its cocoon crosswise of the twig, so that it might become bound to it in this manner, instead of attaching it lengthwise as insects generally place their cocoons, and from the further fact that it imbedded the lower end of the leaf stalk in the outer surface of its cocoon, evidently for the purpose of holding the leaf steadily in such a position that when it wilted it must lop

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directly downward and not sway off to one side. This curious specimen may be seen in the Entomological department of the Museum of the State Agricultural Society.

AFFECTING THE FRUIT.

The PLUM WEEVIL or CURCULIO, No. 70, a small white worm occasionally found in the interior of cherries, is the only insect known to us as infesting this fruit.

9. THE GRAPE.—*Vitis vinifera*, et al.

AFFECTING THE ROOT.

95. GRAPE VINE BORER, *Trochilium Polistiformis*, Harris. (Lepidoptera Trochiliidæ.)

A worm resembling the Peach tree borer, No. 59, in its size and habits, producing a moth resembling a wasp, of a dark brown color marked with orange or tawny yellow, and with a bright yellow band on the base of the second ring of its abdomen, its fore wings dusky, hind ones glassy hyaline with the margins and veins black. Width 1.00 to 1.50. Found by Dr. Kron, in North Carolina, where it is exceedingly destructive to both wild and cultivated grapes. See Patent Office Report, 1854, p. 80.

AFFECTING THE STALK.

96. VINE SCALE INSECT, *Lecanium Vitis*, Linn. (Homoptera. Coccidæ.)

Appearing on the bark in June, a brown hemispherical scale from under one end of which a white cotton-like substance protrudes, more and more, till about the first of July, it becomes four times as large as the scale, and from among it minute oval yellowish-white lice, the hundredth of an inch in length, creep out and distribute themselves over the bark, to which they fix themselves and become stationary, sucking its juices. This appears from the short descriptions given by authors, and from

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specimens sent me by Dr. Signoret of Paris, to be the same with the European scale insect of the vine. See Kollar's Treatise, p. 155.

97. FOUR-SPOTTED SPITTLE INSECT, *Aphrophora 4-notata*, Say. (Homoptera. Cercopidæ.)

A spot of white froth resembling spittle, appearing upon the bark in June, containing under it a pale wingless insect which punctures the bark and sucks its juices, as does also the perfect or winged insect which occurs upon the vines the beginning of July, and is a flattened tree-hopper of a brown color, its wing covers having a blackish spot at the tip, another on the middle of the outer margin and a third at the base, with the spaces between these spots hyaline white. Length 0.30.

98. SIGNORET'S SPITTLE INSECT, *Aphrophora Signoretii*, new species.

In habits and appearance like the preceding, but without any black spots or marks, its ground color being tawny brown with dull whitish clouds, and thickly punctured with black, the wing covers having a small white spot on their inner margin near the tip and a larger one opposite this on the outer margin. Length 0.32.

This species has a whitish stripe between two blackish streaks along the middle of the head, but no distinct raised line either here or upon the front. Still, that it pertains to this genus, rather than to *Ptyelus*, is shown by its ocelli or eyelets, which are placed nearer to each other than to the eyes, and by the base of its head, which is angularly notched in the middle instead of being rounded in a regular curve, as we find it to be in both *Ptyelus* and *Lepyronia*. I regard these as the most valid characters by which to discriminate these closely related genera. Another spittle insect which I discovered common upon the pitch pines on the sand plains of Saratoga, and described in my Catalogue of Homopterous insects in the State Cabinet of Natural History, under the name of *Lepyronia Saratogensis*, was the same year described by Mr. Walker, (List of the British Museum, p. 714,) under the name *Ptyelus gelidus*, his description having issued from the press a few months subsequent to mine. Mr. Walker has, accordingly, in the supplement to his list, (page 1153), done me the justice of giving precedence to my name. I think, however, that both this species and the *parallela* of Say must be carried back to the genus *Aphrophora*, since the nearness of their ocelli removes them from *Ptyelus*, whilst the length and narrowness of their wing covers separates them from *Lepyronia*,

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and the angular notch in the base of their heads, and the pale stripe, slightly elevated, along the middle of the head and thorax, further separates them from the genera to which they have been referred, and approximates them to *Aphrophora*. The foreign species belonging to these genera, with which I have been most liberally supplied by Dr. Signoret, of Paris, enable me to trace the affinities of these rather anomalous insects much more accurately than it would be possible to do without such aid.

The *Cercopis quadrangularis* Say so closely resembles the European *Lepyronia coleoptrata*, that I am surprised to see it placed in any other genus.

The *Cercopis obtusa*, Say, also placed under *Ptyelus* by Mr. Walker, belongs to the genus *Clastoptera*.

The *Cercopis ignipecta* of Harris's catalogue, also supposed to be a *Ptyelus* by Mr. Walker, pertains to the genus *Monecphora*. As this name, *ignipecta*, was published more than twenty years ago and no description of this species has ever been given, I may here supply this deficiency. In size and form this insect has a marked resemblance to the *Monecphora bicincta*, Say, but is destitute of bands or spots on its upper surface. It is black, old specimens fading to brown, and on the under side the breast, the edges of the abdominal segments, the anterior knees and the hind legs are bright blood red with the tips of the feet black. Length 0.35.

AFFECTING THE LEAVES.

1. *Puncturing them and sucking their juices.*

99. LARGE GREEN TREE BUG, *Rhaphigaster Pennsylvanicus*, Degeer. (Hemiptera. Pentatomidæ.)

A large flattened grass green bug edged all round with a light yellow line, interrupted at each joint of the abdomen by a small black spot, its antennæ black beyond the middle of their third joint, with a pale yellow band on the first half of the two last joints. Length 0.60 to 0.70. This occurs, chiefly in September, throughout the Northern States, upon hickory, willow and other trees, as well as on grape vines. Mr. Dallas has recently described it as a new species, naming it *R. Sarpinus*, List of British Museum, p. 276, and Mr. Say has also named it *hilaris*.

100. BOUND TREE BUG, *Pentatoma ligata*, Say. (Hemiptera. Pentatomidæ).

A large grass green bug closely resembling the foregoing, but more widely edged all round, except upon its head, with pale red,

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and with a pale red spot upon the middle of its back, occupying the apex of the scutel, its antennæ green, the second joint dusky at its tip and the three last joints black. Length 0.55, width 0.34. Rare. Though so much like the preceding species this pertains to a different genus, being destitute of the sharp point at the base of its abdomen between the hind pair of legs which may be seen in that insect.

101. MODEST TREE BUG, *Arma modesta*, Dallas. (Hemiptera. Pentatomidæ.)

Tawny yellowish gray thickly dotted with brown punctures, the wing covers commonly red at the apex of their leathery portion, and with a brown spot at the tip of their glassy hyaline ends, the under side whitish with a row of distant black dots along the middle of the abdomen and another on each side. Length 0.40 to 0.46. This is one of our most common tree bugs and will be met with in autumn upon a number of different trees and shrubs. It has the spine-like point on the base of the under side of the abdomen very short, and the angular projection on each side of the thorax is not drawn out into a sharp point, by which characters it is readily distinguished from another species very similar to it, the spined tree bug, No. 26.

102. SINGLE STRIPED TREE HOPPER, *Thelia univittata*, Harris. (Homoptera. Membracidæ.)

A tree hopper shaped like a beech nut, with a perpendicular protuberance on the fore part of its back, more high than wide, its summit compressed and rounded, the insect of a chestnut brown color, tawny white in front and with a white stripe along the back, extending from the protuberance to the tip. Length 0.37, height 0.24. Often seen on grape vines in July and August.

The BUFFALO TREE HOPPER, No. 22, may also be noticed on grape vines every day during the latter part of summer.

103. BLACK BACKED TREE HOPPER, *Acutalis dorsalis*, Fitch. (Homoptera. Membracidæ.)

A small triangular shining tree hopper with a smooth rounded back, greenish white with a large black spot on its back, from the anterior corners of which spot a line runs off towards each eye,

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the upper margin of the head and the breast being also black and the wings hyaline. Length of the male 0.15, of the female 0.20. Numbers of this insect may sometimes be met with on grape vines, about the last of July, and a few stragglers remain into October. The *anticonigra* of M. Fairmaire, (Ann. Soc. Ent., 2d series, iv. p. 498,) differs from this species only in having the fore wings with coarse black or brown veins. All of the many specimens which I have met with in the state of New-York, have the wing veins colorless. This insect and the *calva* of Say, which is slightly smaller and shining black, with the face, shanks and feet dark yellowish, the tip of the thorax and abdomen pale greenish, and the wings hyaline, are the only New-York species of *Acutalis* which I have discovered, although several others occur in Pennsylvania and farther south, and some of them are quite numerous upon the kinds of vegetation which they infest.

104. VINE LEAF HOPPER, *Erythroneura Vitis*, Harris. (Homoptera. Tettigoniidæ.)

Pale yellow with two broad blood-red bands and a third dusky one on the apex, the anterior band occupying the base of the thorax and of the wing covers and scutel, the middle one ending in a much narrower nearly square black spot situated on the middle of the outer side of the wing covers. Length 0.13. Though so small such swarms of these insects sometimes gather on the vines in August and bleed the leaves so freely that they become dry and stiff and of a yellow color, as when fading in autumn. See Harris's Treatise, p. 198.

There are numerous kinds of little leaf hoppers similar to those of the vine. Hitherto they have all been included in the genus *Typhlocyba* by authors. In consequence of their diminutive size they have been less investigated than the other insects of the order to which they pertain. The number and arrangement of the veins in their wing covers and wings, present such differences as would probably have induced authors to separate them into distinct genera, before this day, had they been of larger size and better known. The species, moreover, are so numerous, and will be so largely increased no doubt by future discoveries, that as a matter of convenience a separation among them appears to be required. The characters assigned to the genus, *Typhlocyba*, by different authors, are very confused and contradictory, as they have been drawn from one or another of the species, some defining it as with, others, without ocelli, etc. I was, hence, wholly at a loss with respect to the insects which it was

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proper to include under this genus, several years since, when arranging and naming the New-York Homoptera in the State Cabinet of Natural History. The new genera *Erythroneura* and *Empoa* thus came to be proposed by me, for the reception of a portion of these insects. The characters on which these genera were founded, I since learn, make them the equivalents of some of the leading sections into which the genus *Typhlocyba* is divided by Burmeister, Zetterstedt, and others. These names may, therefore, remain for distinguishing those species in which the veins of the wings are less numerous and fully developed than they are in *Typhlocyba* proper. The insects in question will thus be divided as follows:

TYPHLOCYBA. Wing covers bordered on the hind part of their inner side by a submarginal vein running parallel with the exterior edge, and commonly having a closed discoidal cell also.

ERYTHRONEURA. Wing covers not bordered; their outer apical cell four sided, or with two right angles at its forward end.

EMPOA. Wing covers not bordered; their outer apical cell three sided or with a single acute angle at its forward end.

Each of these genera or sub-genera admit of further division. About ten New-York species or prominent varieties, known to me, fall under the first of these genera, thirty under the second and eighteen under the last. Several of these are very similar to and are probably identical with European species.

105. THREE-BANDED LEAF HOPPER, *Erythroneura tricincta*, Fitch

Like the preceding, but the bands narrower, the anterior one not extended upon the base of the wing covers and the middle one not widened in its middle. Length 0.13. I originally met with this in abundance upon raspberry and currant bushes. Having since found it repeatedly upon grape vines I am inclined to think it may possibly be a variety of the foregoing species. In both the color of the bands varies, being sometimes tawny red and sometimes dusky or black.

106. VINE-DESTROYING LEAF HOPPER, *Erythroneura Vitifex*, new species.

Yellowish white, the wing covers with oblique confluent blood red bands and a short oblique black line on the middle of their outer margin; thorax commonly with three red stripes, the middle one forked anteriorly and confluent with two red stripes on the crown of the head. Length 0.12. When the wing covers are closed they appear red with a cream colored spot shaped like a heart anteriorly, and on their middle a large diamond-shaped spot with a small red spot in its centre. It resembles an individual of the *comes* of Say, having the red spots so enlarged as to all run

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together, but the marks upon the thorax are totally different from those of that species. I have sometimes met with this leaf hopper in such numbers upon the grape vine, in September, that when the leaves were agitated, the insects taking wing resembled a shower of snow flakes. I have also reared it from pupæ found upon the leaves sucking their juices. The young begin to appear a month or two earlier than the perfect insects, and resemble them, but are smaller and destitute of wings. And their cast skins, delicate, milk white, retaining the form of the insect that has left them, may everywhere be noticed adhering to the leaves.

107. WOUNDED LEAF HOPPER, *Erythroneura vulnerata*, Fitch.

Tawny yellowish, sometimes tinged with red, the wing covers with white dots and veins and on the middle of the outer margin an oblique black streak between two cream white spots, the hind one smaller and with an oblique blood red line at its end; tips smoky blackish. Length 0.12. Common in September.

108. COQUEBERT'S OTIOCERUS, *Otiocerus Coquebertii*, Kirby. (Homoptera. Fulgoridæ.)

A slim four-winged fly of a yellowish white color with a bright carmine red stripe along each side of the body and wings, which stripe is widely forked at its hind end. Length 0.42. I have met with these delicate pretty flies from the middle of July to the end of the season, more frequently upon the wild grape vine than on any other plant or tree, but they are never so numerous as to do any perceptible injury, and are chiefly interesting to us as pertaining to a genus peculiar to the United States, and very remarkable for possessing long slender cylindrical appendages attached to the base of their antennæ, nothing analogous to which are found in any other insects. These appendages vary in their length and form in different species. They resemble a slender tapering worm, irregularly crooked, lying upon and rigidly appressed to the cheeks of the insect's face and sometimes passing over the eye. The use of these curious appendages will form an interesting subject for the investigation of some future naturalist of this country. Mr. Kirby long ago described eight species of these singular insects from specimens found in Georgia by Mr.

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Abbot. To these I have recently added a ninth, and two additional species are now known to me, the characters of which may briefly be stated in this place.

109. *Otiocerus Signoretii*. Pale yellow; wing covers with a broad dusky cloud-like stripe from the base to the middle of the inner margin, and extending thence obliquely across to the outer margin at its tip, and sending a very broad branch to the tip of the inner margin; a large blackish dot anteriorly, on the inner side of the dusky stripe, situated in the middle of the subaxillary cell, and four dots on the outer side of the stripe, placed at the angles of an imaginary square, the outermost one of these dots being in the middle of the outer or costal cell; veins yellow, posteriorly red; wings whitish hyaline, their veins red; keels of the upper side of the head minutely toothed, those of the frontal and lower side edged by a slender coal black line. Length of the body 0.20; width of the spread wings 0.60. The antennæ are short, scarcely reaching to the eye, and have but one appendage of about the same length in males. This species is similar to *Reaumurii*, but the dots on the wing covers are differently placed. Two specimens from west of Arkansas, from W. S. Robertson.

110. *Otiocerus Amyotii*. Light yellow; wing covers pale sulphur yellow, with a brown stripe from the base to the middle of the inner margin and thence to the outer tip; a row of blackish dots on the hind edge alternating with the ends of the apical veins, and about six dots forward of the innermost of these, placed on the tips of the subapical and on the bases of the apical veins; three brown stripes on the thorax; an orange red stripe on each side of the head, from the eye to the forward edge below the apex. Length 0.25, to the tip of the closed wings 0.40; width of the spread wings 0.70. I have hitherto supposed this to be the *Wolfii* of Kirby, but having recently captured an individual of that species, the differences between these two insects become evident to me. The *Wolfii* possesses each of the characters above assigned to the *Amyotii*, but the orange stripe on each side of the head is more faint and runs obliquely upward to the apex of the head, where it ends in a short coal black line, exactly as stated by Mr. Kirby; and the wing covers have three distant blackish dots in a row, outside of the brown stripe, one of these dots being placed near the base of each of the discoidal cells. In both of these species the females have two long appendages to the antennæ. The insect described by Amyot and Serville, and by Spinola, under the name *Stollii*, certainly is not the *Stollii* of Kirby, which is a dark colored species like the *Degeerii*; but it is in all probability the same species which I have described above. I have met with this insect in only two instances in this State, and once in New Jersey. All the specimens were females and were found upon hickory leaves.

111. *Anotia Westwoodii*. Another genus of insects peculiar to this country and closely resembling the preceding, except that they are destitute of appendages at the base of the antennæ, was brought to light by Mr. Kirby, in connection with the *Otioceri*. Only a single species of this genus, named *Anotia*

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Bonnetii, has hitherto been known. We have in the state of New-York an insect of this kind which may frequently be met with upon grass and on willows in lowland meadows, from the beginning of August till the end of the season. I have hitherto supposed this to be the *Bonnetii*; but now, when I come to compare a number of specimens with Mr. Kirby's description, it becomes plain to me that this is a distinct species, and I therefore name it in honor of the distinguished British entomologist who has furnished to the Linnean Transactions a valuable paper upon some of the insects of this group. In all the species of *Anotia* several oblique veinlets of a blood red color appear along the outer sides of the wing covers towards their tips; but our New-York species differs from the *Bonnetti*, in that the wing covers have no tint of yellow, and none of their veinlets are black. The veins and veinlets are pallid, and for the most part are broadly margined with pale brown, which color also forms an irregular band before and another behind the middle, leaving large whitish hyaline spots in the intervals. The rib vein commonly shows three or four blackish alternations forward of its middle, and there is also a short black streak upon the middle of the inner margin. The wings are whitish hyaline with a blue iridescence, and their veins are slender and whitish with the veinlet at the apex of the outer discoidal cell robust, black, and slightly margined with brown. The thorax is pale yellow, smooth and shining, with three elevated white longitudinal lines. Length 0.15 to tip of the wings 0.26; width 0.45.

Two other species of this genus are known to me, the distinctive marks of which may here be stated. They are the same size with the preceding.

112. *Anotia Burnetii* is much nearer related to *A. Bonnetii*, the three veinlets in the disk of its wing covers being blackish, but it is readily known from the other three species by a black stripe above along the middle of the three first segments of its abdomen. It is white, its wing covers milky white and subhyaline, with faint clouds of a more dusky tinge forming about three imperfect bands. A single specimen was captured by Albert Gallatin Burnet, upon ash bushes beside Henderson river in Illinois. The insects of this genus hence appear to inhabit low humid situations, whilst those of the genus *Otiocerus*, according to my observations, all occur upon bushes growing in dry uplands.

113. *Anotia Robertsonii* is very similar to the *Burnetii*, appearing to differ only in having the tips of its antennæ and its feet blackish or dusky and the back of its abdomen white without any blackish discoloration. Two specimens sent me from west of Arkansas, by W. S. Robertson.

I here subjoin a short account of two other singular insects pertaining to this family, as I have for several years been sending specimens of them abroad with merely the name by which they are ticketed in my private collection appended to them. They are most nearly related to the *Caliscelis Bonelli* of Latreille, an Italian species very rare in collections, for a specimen of which I am indebted to Dr. Signoret of Paris. This insect is commonly made the type of a distinct tribe or sub-family by authors, it differs so prominently from all its kindred. Twenty years ago an insect possessing similar distinctive char-

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acters with the *Caliscelis* was found at Mount Pleasant in Ohio, by Mr. Foster, the comrade of Mr. Doubleday, in his entomological tour in this country. It has the head prolonged forwards and downwards in a protuberance which gives it considerable resemblance to a weevil of the genus *Bruchus*. It was hence described under the generic name *Bruchomorpha* by Mr. Newman, the species being named *oculata*. Six additional species belonging to this genus are now known to me. These have all been discovered by Mr. Robertson west of Arkansas, and some of the same insects I have gathered in Illinois and have received from correspondents there. They occur in grass and subsist on its juices. Much the most common species I name:

114. *Bruchomorpha dorsata*. This is black and shining, with a pale yellow stripe along the middle of its back from the front to the tip, its legs being also pale yellow with a dusky stripe on the thighs. Length 0.16. Mr. Robertson has discovered individuals having the wing covers and wings fully developed, showing that it is a pupa which is described by Mr. Newman. Or it may be as Mr. Westwood suggests in a letter to me, that these insects, like some of the *Nepidæ* and other species belonging to this order, attain to puberty and perish without acquiring wings, whilst in other individuals of the same species the wings become fully developed. An individual which I captured in Illinois in October, I preserved alive in a vial more than a month, supplying it frequently with fresh grass. During that time its rudimentary wing covers did not appear to make any advance in size. And at so late a period in the season we should expect it to be grown to the full dimensions which it is its ordinary habit to attain. These facts render it highly probable that Mr. Westwood's supposition is correct. But be this as it may, those individuals whose wings are rudimentary will always be the specimens found in cabinets and from which the species will be chiefly studied, since they are so much more readily captured and show the same colors and marks which belong to the full winged individuals. Mr. Robertson informs me these insects are very shy and timid, and difficult to obtain; they leap with surprising agility, throwing themselves some eighteen inches at a single bound; and like other insects, when their wings are fully grown they become still more spry and active. Hence specimens having the wings perfect will always be comparatively rare in collections.

115. *Naso Robertsonii*. Closely related to *Bruchomorpha* is another insect in which the protuberance of the head instead of being compressed is cylindrical and abruptly enlarged at its apex into a smooth polished black knob of a spherical form, thus resembling a species of *Bruchus* with a drop of liquid pitch adhering in a globule to the end of its beak. I hence name the genus from the Latin, *naso*, having a great nose. This insect is of a dull pale yellow color, with an elevated line along the middle, its whole length, on each side of which the head and thorax have numerous coarse black punctures symmetrically arranged in rows, and there are two oblong black spots above, upon the beak, two round ones between the eyes and two smaller ones upon the scutel. The segments of the abdomen are occupied with little short black furrows running lengthwise. The wing covers are rudimentary, covering the

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basal half of the abdomen, and are black with a net work of irregular coarse elevated veins of a pale yellow color and an elevated dot of the same color in the centre of most of the cells. Length 0.18. Several specimens have been sent me from west of Arkansas by Mr. Robertson, and I also found it in Illinois.

116. VINE APHIS, *Aphis Vitis?* Scopoli. (Homoptera. Aphidæ.)

A plant louse is reported as very destructive to the leaves and young shoots of the grape at the south, which perhaps is the same insect which infests the vine in the southern parts of Europe, but as no description of it is given we are unable to judge whether it possesses any resemblance to the foreign species. See Patent Office Report, 1854, p. 79.

2. *Forming excrescences upon the leaves*

117. GRAPE LEAF LOUSE, *Pemphigus Vitifoliae*, Fitch. (Homoptera. Aphidæ.)

Early in June, a small globular gall the size of a pea, growing upon the edges of the leaves, of a red or pale yellow color and its surface somewhat uneven and woolly, with a cavity inside, in which is a pale yellow louse of a flattened hemispherical form, with short blackish feet. Length 0.04. See Transactions, 1854, page 862.

3. *Worms eating the leaves.*

118. VINE DRESSER, *Chærocampa Pampinatrix*, Smith and Abbot. (Lepidoptera. Sphingidæ.)

Eating the leaves and nipping off the fruit stalks, causing the clusters when but half grown to drop to the ground; a thick cylindrical worm, tapering anteriorly, its third and fourth rings thicker and slightly humped, a short horn at the end of its back, forward of which is a row of five round rusty yellow or clay colored spots, surrounded except on their fore side by pale yellow; ground color pale green freckled with pale yellow dots, when mature changing to pale dusky olive with a dusky stripe on each side of the back, below which is a broad bluish or pink white stripe sending five branches obliquely downward and forward

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Length 2.25. The pupa under leaves on the ground, in a slight cocoon, giving out the moth the following June, which hovers about flowers at twilight, like a humming bird, (as do all the other moths of this family,) and may be distinguished by its hind wings which are rusty orange yellow without any spots or border of a different color. Width 2.00 to 2.75. See Harris's Treatise, p. 149.

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119. SATELLITE SPHINX, *Philampelus Satellitia*, Lin. (Lepidoptera. Sphingidæ.)

In August and September a thick smooth worm resting with its head and neck drawn in, making the anterior end blunt and thickest; when young pea green with a tail standing upward and curved forward like that of a dog; when older with a glassy eye-like spot in place of the tail, and of a velvety olive brown color paler on the back, freckled anteriorly with black dots and along each side five or six large oval bright cream colored spots with the breathing pore resembling a black dot in each spot. Length 3.00. Buries itself in the ground, the moth appearing the following July, its hind wings with an olive green border having a large blackish cloud on its anterior edge, forward of which these wings are pale greenish gray with a large black spot on the middle of their inner margin. Width 4.00 to 4.75. See Silliman's Journal, vol. xxxvi, p. 299.

120. ACHEMON SPHINX, *Philampelus Achemon*, Drury.

A worm like the preceding, but with the edges of the cream white spots scalloped, producing a moth having the hind wings pink red with a dusky border in which is a row of small black spots becoming faint towards the outer margin. Width 3.00 to 4.00 See Harris's Treatise, p. 248.

121. AMERICAN FORESTER, *Procris Americana* Bois. (Lepidoptera. Anthroceridæ.)

In August, standing in a row side by side on the under surface of the leaf, eating its edge and leaving only the coarse veins; little yellow worms about 0.60 long and slightly hairy with a transverse row of black spots on each ring; forming thin tough oblong oval cocoons, in crevices; the moth appearing the follow-

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ing July, wholly of a blue black color except the neck, which is bright orange yellow, its body ending in a broad fan-like notched tuft. Width 0.90. Much more common at the west and south than in New-York. See Harris's Treatise, p. 257.

122. EIGHT-SPOTTED FORESTER, *Alypia 8-maculata*, Fab. (Lepidoptera. Anthroceridæ.)

The last of June, a white or light blue cylindrical worm banded with black lines and on the middle of each ring a broader orange yellow band dotted with black, and posteriorly upon each side a conspicuous white spot; growing to 1.25 in length, leaving the vines about the middle of July, and inclosing themselves in slight webs upon the ground. The moth appearing in May, black with orange shanks, each of the fore wings with two large light yellow spots, the hind ones with two white ones. Width 1.00 to 1.50. This is a common insect at the south, and Mr. Calverley informs me he has frequently captured it around New-York. It has also been found occasionally in the vicinity of Albany.

123. BEAUTIFUL WOOD NYMPH, *Eudryas grata*, Fab. (Lepidoptera. Notodontidæ.)

In July and August, a worm in all respects like the preceding one, except that it has no white spot on each side and is slightly humped above at its hind end; burying itself three or four inches in the ground, and there passing the winter in its pupa state, the moth coming out in July. This has the fore wings milk white, bordered behind, and also on their outer side from the base to the middle with rusty brown edged on the inner side with greenish olive, and with a wavy bluish white line on the hind edge at the base of the fringe; hind wings nankin yellow with a blackish brown border which does not extend to the outer angle. Width 1.65 to 1.85. See Harris's Treatise, p. 330.

124. PEARL WOOD NYMPH, *Eudryas unio*, Hubner.

This is equally as common as the preceding, and the worms are so much alike that we as yet know not whether there are any marks whereby they can be distinguished from each other. The moths too are very similar, but the present species is somewhat smaller, and has the border of the wings paler and of a tawny

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red color, with the olive inner edge wavy instead of being straight as it is in the foregoing species, and on the hind wings this light red border is extended to the outer angle.

If these pretty zebra-like worms become so numerous upon the vines that it is desired to exterminate them and the handsome moths which they produce, this object will probably be most readily accomplished by picking off each leaf on which a worm is found and throwing it into the fire or otherwise destroying it. Mr. T. B. Ashton, of White Creek, informs me that in 1854 he found upwards of 150 of these worms on his vines, which being destroyed, only one worm made its appearance the next year. He also says, when the worms leave the vines, if they can find a corn cob or a piece of soft decayed wood lying on the ground, they bore into it rather more than the length of their bodies, closing the orifice with their chips, and there pass their pupa state, in preference to burying themselves in the ground. All such observations as this are of value to us, and are not matters of mere idle curiosity, as ignorant persons suppose. If the fact be as above stated, it occurs to me that whenever these worms are noticed to be common upon the vines, their further multiplication, may be arrested with the greatest facility by scattering broken corn cobs upon the ground beneath, where the worms when they descend from the vines will find and will enter them, and in the autumn or spring following, raking these cobs together in a heap and burning them.

125. WHITE MILLER, *Spilosoma Virginica*, Fab. (Lepidoptera. Arctiidae.)

A large thick-bodied caterpillar two inches long, densely covered with soft long hairs of a pale yellow, sometimes foxy red or brownish color, its skin straw yellow, commonly with a black stripe along each side, with the joints of its body and its under side also blackish. This and the caterpillar of the *Isabella* moth (*Spilosoma Isabella*) which has hairs much more stiff and even shorn at their ends and of a fox red color and black at each end of its body, are the two common large caterpillars seen everywhere in the State of New-York, especially in autumn, often crawling into our dwellings and spinning their cocoons behind chests and other furniture. Out of doors they place their cocoons slightly

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attached to the under side of boards, billets of wood, and in similar sheltered situations. The cocoon is about 0.85 long, oval with the ends rounded, of a dirty gray or pale brown color, and with the hairs of the caterpillar woven into its outer surface. The moth of this species is most common in May and June, but specimens occur at all times, coming out even in winter in stove-warmed rooms in which caterpillars have happened to secrete themselves. It is snow white with a black dot in the centre of its wings, and the hind part of its body has a row of black spots above and another along each side, with a bright ochre-yellow stripe between, and the forward hips and thighs in front are also of this last color. Width across the wings 1.50 to 2.00. The caterpillars are not stationary, but wander about and feed on a great variety of leaves, eating their edges irregularly; and they seem to regard the texture rather than the taste of their food, for I have noticed them in the greatest numbers upon trees and plants whose leaves are most soft and tender, withering from the slightest touch of frost, such as the convolvulus, bean, grape, butternut, &c. See Harris's Treatise, p. 268.

126. SPOTTED-WINGED SABLE, *Desmia maculalis*, Westwood. (Lepidoptera. Pyralidæ.)

The side of the leaf rolled into a cylinder and tied with silken threads, with a slender slightly tapering worm residing therein, 0.90 long, leaf green, having a black U-shaped mark upon its neck and black spots upon the following ring; the pupa formed in the same place, the moth coming out the last of June and in July, of a black brown color with two large roundish snow-white spots on the fore wings and the hind wings with a white band across the middle, (broken apart in the female,) and with two white bands on the abdomen. Width 0.75 to 1.15. This may frequently be met with in all parts of the United States. The males are readily distinguished from all the other insects of the order Lepidoptera by a most remarkable peculiarity. Their antennæ are elbowed, similar to those of the weevils, and ants and bees. They have a little brush-like tuft of hairs in their middle, jutting out upon one side, their first joint being long and thickened towards its tip. See Patent Office Report, 1854, p. 78.

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- 127.** GARTERED PLUME, *Pterophorus periscelidactylus*, Fitch. (Lepidoptera. Alucitidæ.)

Consuming the young leaves, in June, and hiding itself in a hollow ball made of one or more leaves drawn together by silken threads; a cylindrical pale green worm, nearly half an inch long, with rows of white elevated dots sending out radiating white hairs, the pupa suspended by its tail and hanging with its head downwards, and in about a week giving out the moth, early in July. The moth tawny yellow, its wings split into long narrow lobes, the fore pair with three white spots and beyond these two white bands, the fringe white with a blackish spot on the middle and another on the apex of the inner margin. See Transactions, 1854 p. 843.

4. *Insects eating the leaves.*

- 128.** GRAPE-VINE FLEA-BEETLE, *Haltica chalybea*, Illiger. (Coleoptera. Chrysomelidæ.)

Early in spring, eating holes in the buds and leaves, a small oblong oval flea-beetle, 0.16 long, polished and sparkling, of a deep greenish blue color, some of the individuals often deep green, purple or violet, their under side dark green and their antennæ and legs dull black. This sometimes invades the plum also, as mentioned p. 362, and it also infests the elm and the alder. Its winter retreat is in crevices of the bark and in the earth immediately around the root of the tree on which it feeds, and its colors are then much less bright and sparkling than in summer. See Harris's Treatise, p. 114.

Chevrolat in Dejean's Catalogue has cut up the Chrysomelidæ into a multitude of genera. Whether the divisions which he has instituted should be received as anything more than subgenera appears doubtful. But however this may be, Linnæus originally gave the name *Altica* to a section or subgenus of *Chrysomela*, which has since been currently admitted to the rank of a genus, with a slight rectification by some authors in the orthography of its name. The species *oleracea* being originally placed at the head of this genus, must be regarded as its type. Therefore, whatever may be the destiny of M. Chevrolat's other proposed genera, that which he names *Graptodera*, under which *oleracea* and our American *chalybea* are arranged, can in our view be regarded only as a synonym. Nothing stable and permanent can ever be reached in this part of the science, if old generic names are to be cast overboard in this summary manner.

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The *Eumolpus Vitis* which often sadly devours the vine leaves in southern Europe, Kirby states to be common in New-York and Canada; but I think this is a mistake.

The ROSE-BUG, No. 50, is one of the greatest pests to the vine, in neighborhoods where it abounds.

129. LIGHT-LOVING ANOMALA, *Anomala lucicola*, Fab. (Coleoptera. Melolonthidæ.)

The fore part of July beetles resembling in their appearance the May-beetle, No. 76, but of a much smaller size, being only about 0.35 long, become common on both wild and cultivated grape vines, feeding upon the leaves. From their colors and marks they would appear quite plainly to be of at least four very distinct species, and Fabricius has named and described three of them as such. But as they are always found associated together, and similar insects in Europe vary similarly in their colors, it is probable they are as authors have supposed, mere varieties of one species. They may be distinguished as follows :

1. The GLOOMY ANOMALA (*A. mærens*, Fab.) of a pale dull yellow color, the thorax sometimes reddish, and with the knob of the antennæ and the middle of the breast black.

2. The SPOTTED NECK (*maculicollis*,) like the preceding, but with a black stripe or large spot on each side of the middle of the thorax, and often the hind part of the head and the outer side of the wing covers also black.

3. The LIGHT-LOVING (*lucicola*, Fab.) pale dull yellow with the thorax black except on each side and on the middle of its hind edge, the hind part of the head, the scutel and under side of the body being also black, with the abdomen brown or sometimes dull yellowish.

4. The BLACK (*atrata*, Fab.) black throughout, the abdomen commonly tinged slightly with pale. See Harris's Treatise, p. 29.

130. SPOTTED PELIDNOTA, *Pelidnota punctata*, Linn. (Coleoptera. Scarabidæ.)
[Plate ii, fig. 6.]

A large broad oval beetle of a pale brownish yellow color, with a black dot on each side of the thorax and three others along the outer side of each wing cover, as represented in the figure on

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plate ii, may almost always be found on grape vines, in July, August and September, and numbers of them frequently occur upon the same vine. See Harris's Treatise, p. 22.

131. WHITE FLOWER-CRICKET, *Ecanthus niveus*, Degeer. (Orthoptera. Achetidæ.)

Mounted among and feeding upon the leaves of the vine, in August, a slim narrow cricket about 0.70 long, of a clear white color throughout.

The genus *Ecanthus* to which this insect pertains, was founded by Serville upon a species common in the south of Europe, named *pellucens* by Scopoli, for specimens of which, with many other European Orthoptera, I am indebted to M. Brisout de Barneville. Congeneric with this European insect we have three species in the United States, which are but little known, although they were named and described by Degeer nearly a century ago, and two of them are so common in the State of New-York that their song is often heard upon the vines and bushes in our yards, night after night, through the latter part of summer. And as they are on several accounts an interesting and singular kind of cricket, I here present the investigations which I have made relating to them.

The European and our American flower crickets all bear a striking resemblance to each other, both in their external appearance and their habits, showing this to be one of the most natural genera in the family to which they pertain. They also differ very much from all the other crickets. They are mostly of a clear white color instead of black or dull brown which are the prevailing colors among the insects of this group. Their form also is long and narrow, particularly in the females, which have the wings wrapped more closely around the body than they are in the males. Their hind legs also are long and slender, resembling those of a grasshopper more than a cricket; and their hind feet have four joints, all the feet in other crickets having three joints only. Brulle, who subjected the European species to a rigid examination, and was the first to detect the number of joints in its feet, and some other important points in its structure, states (Hist. Nat. des Ins. vol. ix, p. 174) that the thorax of this

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genus is of a conic form and narrower towards the head than at the opposite end, and Serville repeats this, as being one of the most prominent characters whereby the insects of this genus may be distinguished. But, as we shall see, the form of the thorax varies greatly with the species, and approaches a conic form in only one of our American flower crickets. The other marks, however, which we have stated above, will suffice for readily distinguishing the insects of this genus.

In their habits they also differ remarkably from other crickets. The observation of Latreille, that they dwell upon plants and are pleased with flowers, applies with considerable exactness to our American species, which may be met with in autumn quite common upon the flowers of the golden rod (*Solidago*), and in August I have noticed them on rose bushes, several individuals being sometimes seen on one bush. It was from this statement of Latreille that Serville gave the generic name *Æcanthus* to these insects, this name being formed from two Greek words, implying "I dwell in flowers." But any situation where the foliage is dense, furnishing them a cool shady hiding place, appears to be what they particularly desire, as they occur quite frequently on grape vines, on young oaks and other bushes, where no flowers are near them. All other crickets it will be recollected reside upon the ground, in holes under stones, and similar situations. And it has been noticed of these insects and their kindred, that a peculiarity in the structure of their feet appeared to be essential to adapt them for the situations in which they reside—the catydids and other insects which dwell upon shrubbery having soft flat cushion-like soles to their feet, to enable them to cling to the stalks and leaves of plants, whilst in the crickets and other insects which reside upon the ground no such structure exists. (Westwood, *Introd.* i, 441.) The flower crickets, however, appear to present an exception to this rule. They always reside upon plants, elevated from the ground, and yet the under sides of their feet are simple and merely covered densely with bristles, like those of other crickets. But perhaps this is no just exception to the rule stated. Though they dwell on plants, they do not travel about upon them, but remain stationary, each one in his own chosen abode, day after day. So I infer, from having

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noticed the song of one of these insects proceeding from the same spot upon a mass of vines or upon a particular limb of a tree, upon each evening for a number of nights in succession. And it is quite probable therefore, that the simple structure of their feet incapacitates them for clinging and leaping about from one leaf to another.

Some of our most important information respecting the habits of the flower cricket we obtain from a Memoir published in Italy more than a century ago, by M. Louis Salvi, no subsequent writer appearing to have observed the same facts. From him we learn that the female with her awl-like ovipositor pierces upon their under side the green succulent stalks of the vegetation on which she resides, to the very pith, and crowds commonly only a pair of eggs into the nest thus formed. A number of these punctures are made near each other, till her whole supply of eggs is disposed of. The eggs remain till near the middle of the following summer, when they give out the young crickets, which resemble their parents in form, except that they are without wings. They secrete themselves in the thickest masses of leaves, until they get their growth, changing their skin several times.

In the southern part of our State the song of the flower cricket begins to be heard as early as the first of August, but it is a week later before it commences in the vicinity of Albany, and later still in the more northern parts of the State. Perched among the thick foliage of a grape vine or other shrubbery, some feet up from the ground, and as already stated, remaining in the same spot day after day, its song begins soon after sunset and before the duskiness of twilight arrives. It is distinctly heard at a distance of several rods, and the songster is always farther off than is supposed. Though dozens of other crickets and catydids are shrilling on every side at the same time, the peculiar note of this cricket is at once distinguished from all the rest, consisting of repetitions of a single syllable, slowly uttered, in a monotonous melancholy tone, with a slight pause between. The children regard this cricket as no votary of the temperance cause; they understand its song to consist of the words *treat—treat—treat—treat*, which words, slowly uttered, do so closely resemble its notes that they will at once recall them to the recollection of almost

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every reader. And this song is thus continued without the slightest variation and without any cessation, I think, the whole night through. I however have sometimes heard it at the first commencement of its evening serenade uttering three syllables resembling the words *treat, treat, two; treat, treat, two*—as though the songster was supplicating a libation for his voiceless female mate as well as himself—a longer pause following each third note. This prelude is probably performed in limbering or otherwise adjusting his organs, preparatory to performing the regular carol, which is struck into in a few moments.

It merits, in passing, to be remarked, that whilst the song of the common cricket of the eastern continent aids in producing sleep and has been so much valued on account of this property that it has in some countries been made an article of traffic, and inclosed in cages is placed in the dormitory, the song of our flower cricket has exactly the opposite effect. Occasionally, from vines growing in front of the window, one of these little musicians will find his way into the bed-chamber, when, as Dr. Harris observes, his incessant and loud shrilling will effectually banish sleep. Perhaps the lodger out of all patience at last gets up and makes for the spot from whence the annoyance proceeds; but the song abruptly ceases with his approach. He however fumbles around in the dark, beating upon the wall high and low, and probably encountering an unexpected number of chairs and wash-stands, till he flatters himself he has destroyed his tormenter or has at least frightened him into silence for the rest of the night. Then returning to his pillow and adjusting himself again for sleep, he is able to exult in the sweet stillness that pervades the apartment, for a moment only, before the same execrable creaking breaks forth again as shrill and vigorous as before.

Many persons have noticed the catydid when singing, so far as to see that it is by rubbing its hind legs against the outer sides of its wing covers that its stridulation is produced. In the cricket, however, the hind legs are much shorter, and here we find that it is not by them but by raising its wing covers slightly so as to rub the under surface of one of them against the inner edge of the other that its song is caused. As the flower crickets have long slender hind legs similar to those of the catydids, we might sus-

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pect their note to be produced in the same manner. We however find that in this as in so many other points they are related to the crickets. And when we come to examine their wing covers, we are able to discover the very curious apparatus by which their stridulation is produced; and we find a peculiarity in its structure which at once explains why it is that the song of this insect consists of a single note always followed by a full pause or total cessation of the sound, instead of being continuous or nearly so as it is in other crickets.

In the males the wing covers are flat and placed horizontally upon the back, with their outer third turned perpendicularly downwards and covering the sides. They are very thin and transparent, like clear glass, and may be compared to a window, with the veins like the sash dividing them into a number of panes or cells of various sizes and shapes. The four largest of these cells are placed in the disk or middle part of the wing, and are divided from each other by three straight veins, crossing the wing obliquely, the two hind ones parallel with each other, the forward one meeting these at a right angle and forming with them the likeness of a very full-faced letter V impressed transversely. They thus resemble stout braces so placed in the wing as to keep the ribs and other longitudinal veins pressed asunder, hereby putting on the stretch the delicate membrane which forms the panes between the several veins. Thus each of these panes is like the head of a little drum or tabor, and when played upon, all vibrating at the same instant produce the one shrill note which this insect utters. And to augment the sound still more, it may be observed that the membrane forming each one of these panes is not a simple smooth surface, but is striated with numerous little elevated lines.

It now remains for us to describe the curiously constructed instrument by which all these little tabrets are excited into vibration. On the inner margin of the wing cover, at the anterior end of the V-like mark above described, will be seen a small thickened or callous-like spot from the fore part of which four veins extend to the base of the wing. The inner or hindmost one of these is the most thick and stout, and when particularly inspected it is found to be in several respects different from all the rest of the

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veins. It first runs straight inwards, almost transversely, and then abruptly turning extends with a curve to the base of the wing, this curved portion being more slender. On the upper or back side of the wing this vein is pressed strongly downwards, whereby a furrow is formed in the surface above it. On the under side it stands out from the surface in bold relief, forming an elevated ridge. Now it is this prominent ridge which is applied to the inner edge of the opposite wing cover, and as it runs transversely it will at once be seen that when the wing covers are slightly spread apart and closed again, the motion will draw this ridge up and down against the edge to which it is applied, precisely like the bow of a violin playing upon the strings. This vein may therefore appropriately be named the fiddle-bow, M. Goureau the only one who has particularly described these parts in the common cricket having given to it the corresponding French term *archet*. But if this vein were smooth like the other veins it obviously could produce no vibration. It would be like a fiddle-bow when greased. On examining it therefore with a magnifying glass in a strong light, an appearance like that of very fine transverse lines may be discovered. And on being placed in a microscope the real structure of this part may plainly be seen. What at first appeared like fine transverse lines is found to be a regular row of little flat cogs or teeth, resembling the front teeth of man, but rather more broad than high and slightly narrowed into a neck at their bases. They are inserted at short distances apart, somewhat as the nails of the fingers appear when the end of one finger is placed upon the top of another in a row. It is but a short portion of the most projecting part of the vein that is occupied by these teeth—little more than the twentieth of an inch in length; and in that short distance twenty-one teeth are inserted, with intervals between which are more than double the length of the teeth. The teeth do not stand perpendicular to the surface, but incline towards the inner margin of the wing cover, and that portion of the vein which is studded with them is about the tenth of an inch from the inner edge. We shall now be able to understand the cause of the several peculiarities in the stridulation of this insect. It will readily be perceived that its fiddle-bow being drawn against the edge of the opposite wing cover, and the teeth

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with which it is furnished grating thereon will cause such a jar in the sash or frame work of both wing covers as will impart a brisk vibration to all the little tabrets or membranous cells which are placed in this frame work. And the shrillness of the note of this insect is due to the extreme thinness of the membranes and the violent vibrations into which they are thrown by the sharp grating which these projecting teeth of the fiddle-bow with the little intervals between them produce. As the teeth incline inwards they act only when the wing covers are shutting together; when they are opening apart no grating can occur. It hence results from this peculiar mechanism that as the wing covers are successively opened and closed, notes and intervals of about equal length are alternately produced. The row of teeth moreover being so short, they can cause a vibration of only a moment's duration, and it is not in the power of the insect to produce a continuous sound or a prolonged note. The reason of the several differences between the song of this and of the common cricket, whose stridulation has been described with so much exactness by M. Goureau (*Annals Soc. Ent.* vol. vi, p. 34) are all readily explained by the differences which we find in the structure of the wing covers in these two insects. In the common crickets both of Europe and of this country, the fiddle-bow instead of projecting teeth is merely furnished with elevated transverse ridges or ribs, and these occupy its whole length. Hence its note is more prolonged and far less loud and shrill than that of the flower cricket. M. Goureau was able in the dead insect to so move its wing covers whilst they were still pliant, as to produce the same sound which it utters when alive; and by merely scratching with a pin upon the fiddle-bow he found this sound was produced, though more feeble, as but one wing cover was hereby vibrated.

The WHITE FLOWER CRICKET measures about 0.50 to the tip of its abdomen and its total length is about 0.70. It is of a milk-white color, sometimes with a slight tinge of green. The tips of its feelers and of its feet are tawny yellowish and there is commonly a spot of the same color upon the top of its head, which is oblong and broader at its hind part, commencing between the bases of the antennæ and extending back to a line with the hind side of the eyes. The eyes in the living insect are of the same white color with the body, but after death change to a brownish clay color, though in some specimens they remain white. Upon the under side of each of the two first joints of the antennæ is a black dot, which is sometimes lengthened into a slender stripe or

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line, and in rare instances a second dot is present upon the inner side of each of these joints. The tip of the ovipositor of the females is also black. These are all the characters which are presented by the color in this insect. Numerous others, however, are derived from the form and sculpture of its several parts, of which we notice the following.

The HEAD is twice as long as wide and is inclined downwards obliquely and in the preserved specimens often perpendicularly. It is shaped like an egg, moderately flattened upon its upper side. In dried specimens it is crossed between the eyes by a wide shallow groove. The feelers or *palpi* are long and thread-like, composed of cylindrical joints, of which the penultimate one is almost as long as the last one, which is slightly thicker, long oval, and on its inner side obliquely cut off in a straight slope extending two-thirds of the length of this joint, the face of which slope is hollowed like the inside of the bowl of a spoon. They are clothed with fine erect bristles, in addition to which the last joint is densely coated with much finer prostrate hairs. The *antennæ* are double the length of the body, tapering and very slender, composed of a hundred joints or more, the articulations of which are faint and towards the apex are scarcely perceptible. The basal joint is thrice as thick as the following one, cylindric and but little longer than wide. The succeeding joints are very short, and towards the tip gradually increase in length and diminish in diameter, here sometimes showing tawny brown rings upon the alternate joints.

The THORAX is as wide as long and of the shape of a half cylinder, being rounded from above downwards, with its opposite sides parallel and its angles rounded. On each side low down it forms a thin foliaceous edge which hangs downward and curves a little outward. Both the anterior and posterior edges curve slightly upward and the latter is fringed with short pale yellowish hairs. Upon its surface posteriorly a shallow furrow may be seen along the middle and on each side of it a curved impressed line.

The ABDOMEN is long, cylindrical, soft and often much distorted in the dried specimen and discolored from inclosed alimentary matter. It ends in a pair of long slender tapering appendages which are about equal to the abdomen in their length and are clothed with fine erect whitish hairs. In addition to these in the female is the ovipositor, which is of the same length, with the appendages, reaching to the tip of the wing covers, and is of a hard horn-like substance, cylindrical and straight or very gently curved upwards.

The WING COVERS of the *male* have already been partly described. When folded together they appear perfectly flat and of the shape of an egg with its small end forward. They are rather more than half an inch long, and the breadth of their upper horizontal portion is more than half their length. Their deflected outer portion or costal area is divided by oblique veinlets into about ten cells of a rhombic form. Above these is an elongated elliptic area reaching three-fourths of the length of the wing cover, bounded on each side by two coarse longitudinal veins which are the proper ribs of the wing. This elliptic area is subdivided into several small square cells by veinlets crossing it transversely. The horizontal portion of the wing covers have two veins running parallel with the hind edge and the hind part of the inner edge. The remain-

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ing veins have already been described. In the *female* the wing covers are quite unlike those of the male, being much narrower, and wrapped more closely around the body, giving this sex a more slender form. The flattened upper portion is cut up into many small cells which are mostly square and are formed by six or seven parallel veins which arise from the base of the wing covers and from the inner rib-vein and run obliquely backwards and slightly inwards to the inner margin, and are connected to each other by numerous transverse veinlets. The deflected outer or costal area is similar to that of the males. The longitudinal rib-veins do not form any elliptic area like that in the male. The *wings* are folded together lengthwise under the wing covers, and are of the same length with them in the male, whilst in the female they are longer and project beyond their tips the eighth of an inch or more, resembling little conical tails.

The four forward *LEGS* are rather slender and of moderate length and clothed with fine short soft hairs. The thighs are cylindrical and have a shallow groove along their under side. The shanks are but half as thick as the thighs and taper slightly towards their tips. The forward ones near their bases are flattened and widened and show on both sides a deeply impressed oval and almost transparent spot appearing like a scar. The feet have three joints, of which the first one is long and cylindrical, the middle one is very small and only about as long as it is wide, and the last one with the claws at its tip does not differ from the same joints in the hind feet. The *hind thighs* are very long and slender, nearly equaling the tip of the wings and of the ovipositor. They are much thickened towards their bases, flattened on their inner side and strongly convex or rounded on their outer side. They have a narrow straight groove running their whole length, both on the inner and the outer side, and an elevated line along their lower edge. The *hind shanks* are also long and very slender and thread-like, equaling the thighs in their length and like them clothed with very fine short soft hairs, in addition to which they have along their hind side two rows of small sharp spines or prickles which reach almost to the knee, with three or four pairs of coarser ones towards their lower end, and a crown of coarse ones at the tip whereof two are much longer and have small thorn-like points branching from them. All these spines are white with their points black. The *hind feet* are covered with minute spines or thorn-like points, which are very densely crowded on their under sides. These feet have four joints, one more than is found in other insects of the cricket kind, but the articulation to the middle of these joints is so slight in the present species that it is often wholly imperceptible in the dried specimens. The basal joint is long and cylindrical and forms three-fourths of the total length of the foot. The second joint is of the same diameter with the first, but is quite short, only as long as wide, with the suture at its base slight and often discerned with difficulty. It is cylindrical and divided into two parts by a suture running lengthwise upon each side. The upper half forms two large stout spines, the bases of which are articulated to the apex of the first joint, their lower edge is joined by a suture to the lower half of this second joint its whole length, their tips only being free, jutting onward and overlaying the third joint more than half its length, each spine tapering to a point which is

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black and curved gently upward. The third joint is of the same length with the second but much narrower, when viewed laterally appearing twice as long as wide and of a square form with the apex cut off obliquely. The last joint is more slender and longer than the preceding two taken together, slightly arched and thicker towards its tip. At its apex two small stout and almost straight claws are articulated at right angles with the foot, and at the base of each claw is a small cylindrical pellet, half as long as the claw and of the same diameter, with its apex cut off obliquely.

The following VARIETIES of this species have fallen under my notice:

- a. The black dots on the under side of the two first joints of the antennæ lengthened into short stripes.
- b. First joint of the antennæ with a black transverse stripe beneath, at its apex, forming a right angle with a longitudinal stripe.
- c. Two first joints of the antennæ with a black stripe on their inner and a black dot on their under sides.
- d. Head without any spot or discoloration above.
- e. *discoloratus*. The whole of the head, the first joint of the antennæ, the breast and abdomen of a brownish clay color.
- f. *fuscipes*. One or both of the hind legs more or less tinged with blackish.
- g. *angustipennis*. The male with wing covers a third narrower and somewhat shorter than usual, with the wings protruding like tails from under their tips. Having seen but a single specimen, I cannot regard this as anything more than a variety, since in other species of this family we meet with individuals having the wing covers but partly developed.

With the detailed description of this species which has now been given, it will only be necessary for us to state the more prominent points in which the two other flower crickets of our country differ from it.

We suppose these insects do more mischief by perforating the twigs of different trees to place their eggs in them, causing the death of the parts thus wounded, in many instances it is probable, than by eating the leaves. We are not aware that they ever become so numerous upon vines as to require any exertions for their destruction. Dr. Harris states that they were noticed in one instance piercing and placing their eggs in the branches of a peach tree, and that the tobacco cultivated in Connecticut has sometimes been injured by these crickets eating the leaves. Wherever their numbers and operations render them pernicious, the only mode we are able to suggest whereby to abate the nuisance is to pick them from the leaves by hand and destroy them.

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132. STRIPED FLOWER CRICKET, *Æcanthus fasciatus*, Degeer.

A slender white cricket very similar to the preceding, but having three blackish stripes upon the thorax, the antennæ, abdomen and legs being also black or dark brown, and the thorax narrowed anteriorly.

This is almost as common as the foregoing, in the State of New-York, and the two are often met with associated together upon the same shrubbery. And it is this insect which Dr. Harris describes as being the female of the preceding species. He evidently was unacquainted with the work of Degeer and the characters he assigns to these insects, or he would have been aware of his error, the marks by which this species is distinguished being so plain and so explicitly stated by that author. And the number of specimens which he had for inspection must have been quite limited, or he would have been aware of the fact that females occur which are of the same white color throughout as the males of *niveus*, and that males occur which have the three black stripes on the thorax and the other marks which he supposes are found in females only. And though in their size and form these two insects are most intimately related to each other, when we come to submit them to a careful inspection differences may be detected which, in addition to their colors, serve to assure us that they are really distinct species. Thus, the thorax here is plainly narrowed anteriorly, instead of having its opposite sides parallel with each other. The thin foliaceous edge at its lower margin on each side here hangs perpendicularly downward instead of being curved slightly outward. The furrow along its middle, between the centre and the hind edge, is here more deeply impressed, as is also the curved line upon each side of this furrow. In the wing covers of the male, from the convex side of the curved vein which we have named the fiddle-bow three veins are given off which are parallel and equidistant from each other, and end in a vein which runs lengthwise of the wing, these three veins obviously serving as braces to hold the fiddle-bow tense and firm for the important office belonging to it. In the present species these three veins are straight and run directly into the longitudinal vein at their outer ends, whilst in *niveus* they curve backwards and enter the longitudinal vein very obliquely. The feelers also are rather more

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short and thick in this species, and the slope on the inner side of the tip of the last joint is more distinct and more deeply excavated. Such are the principal differences which the specimens before me indicate as existing between these species. But as a large portion of the insects of this order are subject to considerable variations in the form and sculpture as well as the color of their several parts, it is possible that other specimens may not show all these details to be as I have represented them.

133. DOTTED FLOWER CRICKET, *Ecanthus punctulatus*, Degeer.

A slender white cricket with the head and thorax dull brownish yellow above, the thorax twice as long as wide, and the wing covers transparent with a dusky dot or small oval spot in their centre.

This probably occurs upon the same shubbery on which the two preceding species dwell. I have never met with it in New-York, though it will very likely be found within our borders, Degeer having described it from specimens taken in Pennsylvania. The male is unknown to me, the female only having been sent me from the Southern States. It is more long and slender than the other species, measuring to the end of its body 0.50, wing covers 0.60, ovipositor 0.75, and to the end of its wings 0.90. It differs so far in some important points from each of the other species that some future writer will no doubt make it the type of a distinct genus, a step which would be eminently proper should another species be discovered coinciding with this in those differences.

The *thorax* is long and narrow, twice as long as wide, and when viewed from above appears cylindrical with each end a little dilated or curved outwards. The thin foliaceous margin upon each side is turned outward almost horizontally, its hind part being widened. Upon the posterior part of the upper side is a large round impressed spot appearing as though stamped with a seal, its outer side forming a right angle. The *wing covers* in the females are but little more than half as long as the wings and are very thin and transparent, with opaque white veins, whereof there are two straight longitudinal rib-veins the inner one of which is double, and the space between these two veins is divided into a number of small square cells by transverse veinlets. The deflected outer area is crossed obliquely by parallel veins connected by transverse veinlets dividing the surface into numerous cells which are mostly square, those at the base being much more small and irregular. The flat upper portion is cut up into numerous irregular cells of various sizes by a net-work of short veinlets

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anastomosing in every direction. The central dusky brown spot is placed upon the inner side of the double rib-vein, and commonly there is a more faint spot forward of this, which on its inner side is confluent with a slight cloudiness of the same color which extends from the central spots forward along the middle of the back to the base. Often also a third spot, much smaller, may be discerned in the second or third cell back of the central spot. The *ovipositor* is as long as the abdomen and perfectly straight; its sides are dark brown and its end black. The two appendages at its base are much shorter than in the other species, being scarcely half the length of the ovipositor. The *feelers* are sensibly shorter and thicker than in the other species, their penultimate joint having the form of a reversed cone, its length scarcely double its width and less than half the length of the last joint, which is thicker than those which precede it, and on its inner side is very plainly cut off in a sloping direction from the middle to the tip, with the face of this slope deeply excavated and causing the joint to appear like a hollow tube. The *antennæ* are blackish on their upper side towards the base, or have a black ring at the tip of each joint.

10. THE CURRANT.—*Ribes rubrum*.

We place this shrub and the gooseberry in this connection, as their woody stalks and the form and texture of their fruit give them such a close relationship to the grape; though they might with perhaps equal propriety be classed with the raspberry, strawberry and other small fruits of the kitchen garden.

AFFECTING THE STALKS.

134. AMERICAN CURRANT BORER, *Psenocerus supernotatus*, Say. (Coleoptera. Cerambycidæ.) [Plate ii, fig. 1.]

Feeding upon the pith of the currant and killing the stalks, a small cylindrical white worm wholly destitute of feet and with a small chestnut brown head and black jaws; passing its pupa state in the stalks and the latter part of May changing to a small slender long-horned beetle of a black color edged with chestnut brown, its wing covers each with two small gray spots forward of their middle and a white, crescent-shaped one towards their tips.

In all our gardens numbers of the currant stalks perish every season. To such an extent does this mortality prevail that this fruit would soon disappear from our country were it not that the roots of this shrub are so vigorous, sending up a multitude of new

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shoots every year, whereby the places of those that perish are constantly re-supplied.

After the leaves have fallen in autumn and during the winter these dead stalks are readily distinguished from the live ones by being dotted over with a pretty little fungus the size of a pin head and of a pale bright red color and a corky texture, which I suppose to be the *Sphæria Ribesia* of Fries. Another fungus also appears on the small twigs, very similar to this but having its surface flattened and of a coal black color.

If one of these currant stalks is split asunder the cause of its death is plainly evident. Commonly through the whole length of the stalk the pith is found to have been eaten away by a worm, leaving it hollow or filled in places with a loose woody powder, like fine sawdust. Each of the branches is also found to be bored in the same manner. And lying in this cavity, one, two or more of the worms which have done this mischief are met with, in all the stalks which have recently been destroyed.

The only insect to which this injury has heretofore been imputed in this country is a kind of moth closely related to the Peach tree borer, which perforates the currant stalks in Europe in this same manner and has been brought to this country with the currant. But the past winter, on coming to inspect these worms, finding they were wholly destitute of feet, I became assured they were a different insect from that which they have all along been supposed to be. And on rearing some of them to their perfect form, I obtained in place of the European currant borer, a beetle, one of the native insects of this country whose history has hitherto been unknown, and which is nearly related to the Apple tree borer.

This insect is the *Clytus supernotatus* of Mr. Say (Jour. Acad. Nat. Sci. iii, 425) and of Prof. Haldeman, (Trans. Amer. Phil. Soc. x, 42) and the *Psenocerus Pini* of Dr. Leconte (Jour. Acad. 2d series, ii, 581) and of the Catalogue of Coleoptera lately published by the Smithsonian Institution. It would be an incongruity much to be regretted in the scientific names of the insects of our country, if this species which subsists upon the currant had received a name indicating it to belong to the pine. But fortunately this is not the case. The *Callidium Pini* of Olivier, which Dr. Leconte supposes

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to be the same insect with the *supernotatus* of Say is in reality a very different species pertaining to Dr. Leconte's new genus *Euderces*. How they have come to be pronounced the same it is difficult to understand, since Olivier explicitly states that the antennæ of *Pini* are longer than the body, whilst Mr. Say informs us they are shorter than the body in his species. Olivier's figure *a* of *Pini* is a very correct representation of the insect as it appears to the naked eye. His enlarged figure *b* is much less accurate, especially in the coloring and in placing the posterior white band too far forward. His description of this insect shows this enlarged figure to be inaccurate, and coincides so perfectly with my specimens as to leave no doubt respecting the species to which the name *Pini* belongs. The *Piniadeus* of Fabricius is evidently the same insect described more briefly and much less accurately. Both authors doubtless drew their descriptions from the same specimens, as they both cite the cabinet of Bosc as containing the insect they describe, which insect was found upon pine trees in the neighborhood of the city of New-York Olivier states, whilst Fabricius gives Carolina as its locality. The latter is probably correct, as I have never met with this insect in New-York, and know it only from specimens sent me from west of Arkansas by Mr. Wm. S. Robertson.

The whole length of the dead currant stalks and their branches, from the buds at their tips down to the surface of the ground is commonly found to have been mined by these borers. The hollow in the branches is usually but not always continued down into that in the centre of the main stalk. At least a foot in length of the pith appears to be required to support one of these worms and bring it to maturity. They are particularly fond of the younger and more tender stalks, and these being small have their whole interior ate away almost or quite out to the bark, so that they resemble hollow straws or sticks that have been consumed by white ants so that merely an outer shell remains. And not unfrequently a portion of the upper end of the stalk is broken off, from being so much weakened. The worm hereupon essays to plug up the opening thus made, with its sawdust-like chips, to prevent rain from entering its cell and to exclude spiders and other enemies. Sometimes a greater number of worms are placed

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in a particular stalk than can be accommodated in the pith. In this case some of them resort to the soft outermost layers of the wood immediately beneath the bark, where broad shallow burrows stuffed with the castings of the worm will be met with, occasionally with the worm lying in them. I have in one instance found twelve worms in the different parts of a single stalk.

When the worm has completed its growth and is about to leave off feeding it gnaws a small orifice out to the bark through the wooden wall by which it is surrounded, in order that when it has changed to a beetle it can make its exit from its prison by merely rupturing the bark. The hole thus made is then stuffed full of little chips to protect the bark from being prematurely broken. It then withdraws itself down the stalk slightly below this hole, and constructs a bed on which to repose during the long period of inactivity that now follows. This bed is formed of short woody fibres wadded together and filling the cavity for the length of about half an inch. A similar mass is commonly placed above the worm also, formed mostly of finer materials like sawdust intermingled with brown and white grains, the castings of the worms. The space between these two partitions is about half an inch in length and forms the chamber in which the worm reposes until it changes to a beetle. In the Entomological Museum at the Agricultural Rooms is a currant stalk showing the burrow of this insect, with one of the worms lying in its cell, having a slip of transparent mica cemented over it, and also showing slightly above it the orifice which this worm had cut through the wood whereby to make its exit.

It is about the first of June that the parent insect deposits her eggs upon the currant stalks, and the worms get their growth by the close of the season. They repose in their cells through the winter, changing to pupæ with the warmth of the following spring, and begin to appear abroad in their perfect state as early as the middle of May, the sexes pairing immediately after they come out.

Although the larvæ of this insect are now found in such abundance in the stalks of the cultivated currant in our gardens, before this shrub was introduced upon this continent it doubtless sustained itself upon the wild currant. And it probably is not limit-

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ed to this genus or plants but feeds also upon several other small shrubs growing in our fields and forests, the stalks of which have a texture similar to that of the currant. I infer this from the first pair of these insects which I met with, twenty-five years ago, occurring upon the small-flowered honeysuckle (*Lonicera parviflora*) near which no currant bushes were growing.

The LARVA of this insect is nearly or quite 0.30 long and about 0.07 in diameter, cylindrical and divided into thirteen segments by deep wide transverse constrictions, the last segment being narrower and more or less retracted into the one which precedes it. The head is scarcely half as broad as the body, short and wide, flattened, dark chestnut brown with the base whitish and with short stout triangular black jaws. The second segment or first ring is pale tawny yellow above on its anterior part, the rest of this ring and all the remaining segments being white, rarely straw yellow, shining, soft and flesh-like. It is wholly destitute of feet. To compensate for this deficiency the worm upon the back and beneath is furnished with a cluster of small round tubercles or elevated dots forming an oval spot upon the middle of each segment, whereby it is aided no doubt in clinging to the walls of its burrow as it moves about therein. The breathing pores form a row of cinnamon brown dots along each side. The body is slightly clothed with very fine short hairs, which on the last segment are more numerous and rather longer.

The BEETLE is 0.18 to 0.23 long, the thorax almost as wide as the wing covers and nearly as broad as it is long, with its sides convex. The head and thorax are covered with small deep confluent punctures, those upon the wing covers are much more coarse and are deep and confluent except on the tips where they become smaller and slightly separated. The wing covers have a broad round elevated spot or tubercle at their base, and a narrower hump upon the shoulder. Its color is black with the margins of the wing covers and thorax pale chestnut brown. The wing covers have a large milk-white spot beyond their middle, which is transverse, crescent-shaped with the convex side forward, the inner end slightly separated from the suture and the outer end often reaching to the outer margin; and forward of their middle are two small spots which are sometimes buff yellow, sometimes ash-gray, the forward spot being a short oblique line placed nearer to the suture than to the outer margin, the other spot being a small dot which is often oblong, situated back of the inner end of the first and nearly as far from it as from the suture. All these spots are formed by very short hairs or more properly scales, which are appressed to the surface and in old individuals become rubbed so that the forward spots are more obscure or partially obliterated. The scutellum is ash-gray from similar scales. The antennæ are pale chestnut brown, commonly with a darker brown or blackish band on the thickened apex of each joint, and they are thickly covered with short fine incumbent ash-gray hairs which in a particular reflection of the light give a gray color to the basal portion of the longest joints. They are shorter than the body, thread-like, their first joint thickest, long and tapering to its base, their second joint short, but little longer

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than broad, and shaped like a reversed cone, the two succeeding joints longest of all, the fifth one much shorter and all the following ones shorter still, the last one being pointed at its tip. The under side is black with small punctures which are close and somewhat confluent, and the surface is thinly covered with short incumbent gray hairs. The legs have similar hairs and are pale chestnut with the thickened part of the thighs black and sometimes the tips of the shanks also, the forward shanks presenting a slight wide transverse concavity on their insides.

Variety *a*. Color chestnut brown throughout.

In the cavity in the interior of diseased currant stalks, I have met with a small mite, which is described on one of the following pages, and also with two kinds of larvæ in addition to those of the currant borer. One of these larvæ lies naked among the chips made by the borer, and is scarcely 0.10 long, white, glassy, without feet, tapering to a point at one end, which point is thrust out and retracted at the pleasure of the worm and shows two blackish parallel lines upon one side. I have not yet succeeded in obtaining these in their perfect state, but they are evidently the maggot of some small two-winged fly, which is not a parasite upon the borer, for the remains of no dead worm are seen near them. Their further habits and economy still remain to be traced out.

The other worms are parasites, several of which live together in the body of the borer till they get their growth, by which time they have consumed all the internal parts of their foster-parent so that only the outer skin remains. They then crawl from this skin and spin their cocoons at short distances one above another in the cell. Their cocoons are 0.20 long and of sufficient width to fill the cavity where they are placed. They are thin and almost transparent, appearing like a fine membranous substance through which the worm within can plainly be seen. After finishing their cocoons they cast their skins, which form a little black mass in the upper end of the cocoon. The worms as found in these cocoons in the winter season are 0.13 long by 0.06 in width, white, shining, soft and of a flesh-like substance, their form elliptic but curved into the shape of a crescent, the sutures marked by transverse lines slightly constricted, with a very fine pale brown transverse line placed at the mouth. These worms change to pupæ in the spring and give out the perfect insect the fore part of June. They thus come abroad about three weeks after the borers have come out, so that by the time they are ready to deposit their

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eggs the larvæ of the borer will be grown to a sufficient size to meet their wants. For with such forethought and skill has Omniscience appointed the times and seasons of every creature, that each little insect comes into existence upon the very day that its food is in readiness and everything is matured for it to fulfill its allotted work in the economy of nature.

This parasite of the currant borer is a small four-winged fly pertaining to the order *Hymenoptera* the family *Ichneumonidæ* and the sub-family *Braconides*. It is 0.10 long, black, the first joints of its antennæ and its feelers and legs deep honey-yellow, its mouth, fore-breast and the two first segments of the abdomen darker yellow with a black spot on the first of these segments, and with a yellowish cloud upon the middle of the third segment, the under side of the abdomen being black-brown. Its ovipositor resembles a small bristle and is about a third of the length of the abdomen. It is probable that as this insect walks up and down upon a currant stalk with its antennæ applied to the surface and rapidly vibrating, the sense of feeling possessed by these organs is of such exquisite delicacy that it is able to detect the very spot where a small worm is lying in the centre of the stalk, and that it then insinuates its ovipositor through the bark and wood and punctures the skin of the worm, inserting therein as many eggs as the borer will be able to sustain.

I have attached the name *Cenocælius? Ribis* to this insect in my cabinet. The prædiscoïdal cell of the fore wings occupies but two-thirds of the length of the oblique vein which bounds its anterior side, the first submarginal cell occupying the remainder of this vein, thus separating the prædiscoïdal cell widely from the costa. This induces me to refer this insect to the genus *Cenocælius* of Westwood's Synopsis, though I am by no means certain that it is congeneric with the undescribed species named as the type of that genus. The feelers are very slender and elongated, the maxillaries being longer than the head and about equal in length to the anterior thighs. The head is nearly as long as broad and sub-globular. The antennæ are slender and almost as long as the body. The abdomen is obovate or nearly oval, slightly depressed, equaling the thorax in length and exceeding it in width.

It should be observed before leaving this subject, that I am uncertain whether this insect is the destroyer of the American or of the European currant borer. Though there were several of the American borers in the currant stalk in which I met with

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them, the shrivelled remains of the worm from which these parasites came gave indications of its having been a Lepidopterous rather than a Coleopterous larva. Five of these parasitic worms had come from it, but of this number three were so weak and immature that they died without forming their cocoons.

We have only to state in conclusion, that the utter carelessness with which the currant is treated in most of our gardens, with a thicket of young shoots annually left unpruned and crowding upon and smothering each other, gives these borers and other pernicious insects the utmost facilities for lurking unmolested and pursuing their devastating work without interruption. Were this shrub suitably trimmed and kept thinned out to only three or four stalks from each root these stalks growing freely exposed to the light and air would be little if any infested by these depredating insects.

As these worms remain in the dead stalks through the winter their destruction is easily effected. By breaking off all the dead brittle stalks at the surface of the ground and burning them these borers may at once be exterminated from the garden. But they will soon find their way back again unless the bushes are well pruned every year.

135. EUROPEAN CURRANT BORER, *Trochilium Tipuliforme* Linn. (Lepidoptera. Trochiliidæ.)

Feeding upon the pith of currant stalks causing them to perish, a small whitish worm with a darker line along the middle of its back and a brown head and legs; changing to a pupa within the stalks, and the fore part of June giving out the perfect insect, which is a small moth having some resemblance to a wasp, its wings being clear and glassy, the fore pair opaque yellowish at their tips, with a black margin and band near the middle, and the abdomen black with three yellow bands situated one upon each alternate segment. Width 0.65 to 0.85.

This insect, to which the common names of Currant hawk-moth and Currant clear-wing are given in English works will be more readily known in this country by the name which we have appended to it. A short history of it is given in Dr. Harris's Treatise, p. 255, under the name *Egeria Tipuliformis*. The reason

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why the name *Trochilium* is now given to this genus, instead of *Ægeria*, has already been stated in connection with the Peach tree borer, No. 59. The name *Trochilium* means a little humming-bird, being a diminutive of *Trochilus*, the technical name of that genus of birds, and its appropriateness will at once be perceived by every one who has noticed one of these insects or their kindred of the Sphinx family hovering over flowers, the larger species having often been mistaken for humming birds.

136. WILD CURRANT BORER, *Trochilium caudatum*, Harris.

A worm similar to the preceding, boring in the stalks of the wild black currant (*Ribes floridum*) and producing a brown moth with tawny yellow neck, feet, antennæ and tail, which last in the males is nearly as long as the body. Width 1.00 to 1.25. See Silliman's Journal, vol. xxxvi, p. 311.

137. CURRANT MITE, *Tyroglyphus Ribis*, new species. (Aptera. Acaridæ.)

On diseased currant stalks, in the cavities which have been excavated by borers and under the loose bark, a minute mite scarcely the hundredth of an inch long and less than half as broad, white, shining, its head about half as broad as the body, the head and thorax forming a third of its total length.

Being met with sometimes in excessive numbers in those currant stalks which have been killed by borers, this minute creature merits a notice in connection with them, though we know not whether it should be ranked as an injurious species. Several of the insects of this family are known to be pernicious to the vegetation and the living animals which they infest. But our knowledge of their habits and economy is still so limited and imperfect that it is uncertain whether a large part of them are to be regarded as noxious or innocent. Many of them like the present species appear to be present in the situations where we find them in consequence of disease and decay already existing, and not as the cause of maladies in connection with which they occur. It is also probable that very many if not most of the species of mites which we have upon this side of the Atlantic are identical with those of Europe. One of the evidences of this is now fresh in my mind, and possesses sufficient interest to be stated in this

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place. A few years since I made a partial investigation of the insects which occur in diseased potatoes. Among these I met with excessive numbers of mites, mostly pertaining to two different species. Within a few days past having received from M. Guerin Meneville his paper upon this same subject, published in the Bulletins of the Royal and Central Society of Agriculture, I observed that two species of mites were here described and figured. On comparing these figures with the sketches which I had heretofore taken, their coincidence was apparent on a moment's glance, rendering it evident that these two little creatures which resided in myriads in my own cellar were identical with those found in the same situation in the distant city of Paris.

The mite which occurs in diseased currant stalks, appears to be unlike anything which I find mentioned by authors. It has a considerable resemblance to the longer mite (*Tyroglyphus longior*, Gervais) which has been discovered in company with the cheese mite in the rind of old cheese, but the head here is much larger and the thorax longer, so that the abdomen forms but two-thirds of the length of the insect. A slight but very distinct constriction separates the thorax from the abdomen and a more slight one divides the head from the thorax. The head is shaped like an egg and from its anterior end two small very short bristles project forward like little horns. Two longish bristles project backward from the tip of the abdomen, and there are two shorter ones upon each side of these and another standing directly outward upon each side of the abdomen towards its base. The legs are of equal length, rather slender and cylindric, each having near the tip a longish bristle standing outward. When walking the four hind legs are wholly hid as the insect is viewed from above.

Many hundreds of these mites may sometimes be met with in their winter quarters, heaped together in a mass in the lower end of the cavity which has been excavated by a borer. On bringing them into a warm room they immediately awake to life, all moving their legs but showing no disposition to separate and crawl away.

138. AMPUTATING BROCADE MOTH, *Hadena amputatrix*, new species. (Lepidoptera. Noctuidæ.)

The latter part of May, severing by night the young succulent stalks of currants, roses, &c., a cut-worm 1.50 long, of a brownish

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or livid color, shining, with a chestnut-colored head and a horny spot of the same hue on top of the neck and of the last segment, and with faint dots symmetrically arranged, each yielding a very fine short hair. Burying itself about a month, the moth coming out in July, its fore wings rusty red clouded with gray and blackish, with the usual round and kidney-shaped spots near their centre large, pale gray or white, and beyond these spots a broad bluish-gray band parallel with the hind margin and not reaching the outer edge, this band margined on its hind side by tawny yellow followed by a wavy white line extending across the wing and ending outwardly in a large gray spot which occupies the tip. Colors and marks sometimes dull and obscure, sometimes bright and distinct. Width 1.80.

This is one of our most common night-flying moths. Having been found arranged with British species in some old English collections it was supposed to be a native of that country and was described as such by Mr. Stephens, who conjectured it to be the species named *amica* by Treitscke. Now that it is so evident that this was an error it is improper to continue using this name for this species, and I therefore propose for it a new one having reference to the habits of the larva, this being the first characteristic which comes into the mind, commonly, when this insect is thought of. By this insect in addition to the borers above mentioned Nature endeavors to lop off all that redundancy of stalks which the roots of the currant produce and which man neglects to remove. See Harris's Treatise, p. 350.

APPLE BARK LOUSE, No. 15. I have occasionally seen the bank of both the garden and the wild currant crowded with these minute oyster-shaped scales, the stalks being commonly dead in consequence of their attack. A currant stalk thus excessively over-run may be seen in the Entomological Museum of the Society.

139. CIRCULAR BARK LOUSE, *Aspidiotus circularis*, new species. (Homoptera. Coccidæ.

On the bark of currant stalks in gardens of the city of Albany, early in the spring, I have observed a minute circular flat scale, only 0.03 in diameter, similar to a species named *Aspidiotus Nerii*, but differently colored, being of the same blackish brown hue with the surrounding bark and having in the centre a smooth round wart-like elevation of a pale yellow color.

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140. CURRANT BARK LOUSE, *Lecanium Ribis*, new species. (Homoptera. Coccidæ.)

A hemispherical scale of a brownish yellow color, about 0.30 in diameter, adhering to the bark of the garden currant, its margin finely wrinkled transversely; often perforated with one, two or three holes, from which have issued minute brilliant green four-winged flies which in their larva state have fed upon and consumed the minute eggs which originally existed under these scales. This is quite common in some gardens, and I suspect has been introduced into this country with the currant, although European authors have made no mention of a scale insect as belonging either to this shrub or the gooseberry. It will be most readily found before the leaves put forth in the spring.

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141 AMERICAN CURRANT MOTH, *Abraxas? Ribearia*. Fitch. (Lepidoptera Geometridæ.)

About the middle of June, eating the leaves of the currant and gooseberry, in some gardens stripping the bushes entirely naked; a cylindrical ten-footed measure worm nearly an inch long, bright yellow varied on each side with white and with numerous black spots and large round dots regularly arranged, each giving out a fine black bristle, burying itself slightly and changing to a pupa without forming any cocoon; the moth coming out therefrom about the first of July, of a pale nankin yellow color, the wings with one or more faint dusky spots behind their middle in the male and in the female with an irregular band crossing both pairs. Width 1.30 to 1.45.

This is the most remarkable depredating insect which we have upon the currant in this country. It was fully figured and described in the Transactions of this Society ten years ago (vol. vii, p. 461), at which time it was much more numerous within the sphere of my observation than it has since been, although scarcely a year has passed but that some gardens might be seen with their currant bushes nearly or quite defoliated by it. It has been more numerous the present year (1857) than for several years before, and I learn from Rev. Wm. C. Reichel that in

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Eastern Pennsylvania this same insect has this year totally consumed the currant leaves in several gardens. A letter from Lorenzo Rouse of Paris Hill, Oneida county, enclosing some of these worms in a vial of spirits and soliciting information respecting them, states that they were first noticed in that vicinity three years ago, and that they have continued to increase since that time, stripping the leaves from the gooseberries first and then from the currants. Our wild gooseberry (*Ribes Cynsobati*) was probably the original habitat of this insect, for I have noticed the moth around that bush, growing in the angles of fences, in years when none were observed in gardens; and perhaps one of these bushes set in an infested garden would allure most of these insects to it and render their destruction more easy than when they are scattered. Where these insects once establish themselves they there remain. The same gardens in my neighborhood which were most severely ravaged by them ten and twelve years ago are the ones in which they have been most numerous the present year, notwithstanding that in some of the intervening years these gardens have appeared to be nearly or quite free from them.

Mr. Rouse states that he has applied lime, ashes, soot, snuff, tobacco water and whale oil soap suds to his bushes, but all to no purpose. Shaking the bushes and picking the worms off by hand and destroying them is probably the only effectual mode of exterminating them, as I have heretofore said. Choice varieties of the gooseberry and currant may be securely protected by wholly enclosing each bush in netting made of the cheap fabric used for musketo bars, or some similar material, every worm upon these bushes being previously dislodged.

112. PROGNE BUTTERFLY, *Vanessa (Grapta) Progne*, Fab. (Lepidoptera. Nymphalidæ.)

Eating the leaves the latter part of June, a gray worm 1.25 long with a white head and branching white prickles, their points black; the pupa hanging with its head downwards from the under side of a limb about twelve days and the fore part of July giving out a butterfly with scalloped wings, the hind pair black shaded into tawny yellow at their base where is two black dots, their under sides with a central silvery straight mark bent to an obtuse angle somewhat resembling the letter L. Width about 2.00.

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So long ago as the year 1781 Fabricius (Species Ins. ii, 93) described one of our American butterflies under the name *Progne*, this, in the fables of heathen mythology, being the name of a sister of Philomela who was said to have been changed into a swallow. The deeply notched wings of this butterfly, having some resemblance to the forked tail of a swallow, perhaps suggested this name to Fabricius. Figures and descriptions of this butterfly given by different authors since, have made it well known; but to this day we have remained unacquainted with the vegetation on which it is reared and the caterpillar from which it comes. In June last, two worms were sent me from J. M. Stevenson of Cambridge, one of the Vice Presidents of the State Agricultural Society, found with several others of the same kind feeding upon the leaves of his currant bushes. They proved to be the larvæ of the *Progne* butterfly, and I am thus able to give the complete history of this species. I have also met with this butterfly in thickets bordering on lowland meadows, where it had probably been reared upon the wild black currant growing plentifully in these situations. A caterpillar found upon elms is described by Dr. Harris as being the larva either of this species or of the *Comma* butterfly (*C-album=comma*, Harris.) It now appears beyond a doubt that it pertains to this latter species and not to the *Progne* butterfly under which it is placed. As the *Progne* is so intimately related to the *Comma* or White-C butterfly, and as this species feeds upon quite a variety of trees and plants, it is probable that further researches will show that the *Progne* is not restricted to the currant but subsists upon other kinds of vegetation also.

In very many of its marks no sensible difference exists between this butterfly and the White-C, and the collector who has but one of these species in his hands will be much perplexed to determine which of these names to give to his specimens, with only such brief and imperfect accounts as authors have commonly given to guide him. An exact description of each particular part of an insect is a valuable aid to the student in his researches, in every instance, and is specially required where different species are closely related. I have therefore endeavored to draw up such a description of this butterfly in its different stages as will serve to

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distinctly point it out hereafter to every one into whose hands it may come.

The larva is gray with two or three deep transverse wrinkles at each suture, the bottoms of which wrinkles are black and their summits whitish. On the fore part of each of the abdominal segments is a whitish band which on each side is interrupted by two oblique black spots. Each of these segments also has a pale tawny yellow spot above the breathing pore and a smaller one below it, with prickles placed in each of these spots. The head is white with black dots, and is very rough from numerous short white spines of different sizes, and placed upon its summit are two black prickles with numerous branches which are mostly white with black tips. The two upper prickles upon the second ring are also black like those upon the head, those upon all the other segments are white, mostly with black tips, their branches white, towards the forward end of the body becoming tipped with black more and more. The first ring or neck is destitute of long branching prickles and has only a belt of short spines around its middle, similar to those covering the head. A few similar spines also occur upon the sides of the following segments and on the outer face of the pro-legs. The legs and pro-legs are dull pale reddish, their outer sides black. The mouth is dull reddish and the under side of the body white mottled with brownish dots and short lines.

From this description it will be seen that in its larva as in its perfect state this species is intimately related to the White-C. The Progne however has but one brood each year, the butterflies appearing in the month of July. The two larvæ which were sent me were found on the morning of June 29th to have cast their skins and assumed their pupa form the preceding night, one of them suspending itself from the stalk of a leaf, the other attaching itself to the side of the net in which they were inclosed. And on the morning of July 11th both were found changed to butterflies, the pupa state thus lasting but twelve days. Dr. Harris reports having obtained a Progne butterfly so late as the eighteenth of August, its pupa state having continued but eleven days. The few instances in which I have met with this butterfly have all been in the month of July.

The PUPA is 0.80 long and of a gray color with obscure olive clouds. It has a deep excavation across the middle of its back in which on each side of the middle is a burnished silvery-golden spot and outside of these spots is a blackish streak at the margin of the wing-sheaths. On the opposite side of the body and above this excavation is another similar excavation, at the base of the venter and tips of the antennæ-sheaths—these excavations giving to the pupa a very humped and deformed appearance. A broad dusky olive stripe in which

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the breathing pores are placed, extends along each side of the abdomen and is edged on its front side with a narrow white stripe, and on its opposite side is an elevated black point upon each segment. Along the middle of the back is a whitish stripe which becomes double towards its lower end, and on each side of this is a dull olive spot on each segment with an obtuse elevated point outside of each spot. The lower end or head is deeply notched so as to form a somewhat conical point on each side, resembling a pair of horns.

The BUTTERFLY measures across the spread wings from 1.90 to 2.30. Its *fore wings* are of a bright tawny orange color, sometimes paler tawny towards their tips or over their whole surface. Their hind border is black, commonly freckled with yellow or gray scales on its outer half. Along the forward edge of this black border is a row of seven faint crescent-shaped spots of a paler yellow color than the ground, the second one from the inner margin largest, and those next to the outermost one oval rather than crescent-shaped and commonly with a black dot more or less distinct, placed upon their forward ends. Forward of these pale crescents is a dark rust-red spot upon the inner and a larger one upon the outer margin. A large somewhat square black spot is placed forward of this last one, upon the apex of the discoidal cell, which spot becomes dark rust-red towards its outer end and sometimes does not reach the outer edge of the wing. Upon the disk are five smaller round black spots, the three forward ones in a transverse row, of which the two outer ones are placed in the discoidal cell and nearer to each other and are often smaller and deeper black than the other three, which form a longitudinal row inside of and parallel with the middle vein. The outer margin and hind part of the inner margin is black irregularly alternated with grayish white. At its base the outer margin is strongly contracted or obliquely excavated instead of being straight or merely rounded inward as in other species. The hind margin is irregularly scalloped or wavy along its edge, with a more or less deep rounded excavation in the middle, at the outer end of which is a projecting prominent angle which is commonly acute. The fringe is black with whitish alternations between the projecting teeth. The inner margin is also strongly excavated or arched. The *hind wings* are black gradually shaded into rusty-red across their middle and here often showing short transverse black lines, the basal portion tawny orange with a wide blackish margin and two round black spots, the inner one smaller and tapering anteriorly to a point. In the black ground forward of the hind margin is a row of pale yellow dots, those towards the inner margin more faint and often obliterated. The hind edge is scalloped and wavy, with a deep round excavation between the middle and the inner angle, on each side of which is a projection resembling a short tail which is rounded at its apex and of a bluish gray color. *Under side* dark gray with numerous irregular transverse streaks of black, dusky and brown, giving the surface a peculiar curdled appearance like that of the fabric called "chene cloth." The fore wings are crossed posteriorly with a broad paler gray irregular band, which is widened at its outer end into a large hoary white patch occupying the whole apex of the wing. In the centre of the hind wings is a silvery-white mark which is bent at an obtuse angle in its middle with the two ends straight. This mark is variable, being sometimes slender through its whole length, sometimes twice as thick at its

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lower end as at its upper; its lower part is commonly shorter but is sometimes of the same length with the upper portion; the angle is sometimes but little obtuse, the mark then closely resembling the letter L; the concavity sometimes faces the hind margin near the outer angle of the wing, and sometimes opens towards the outer margin forward of this angle, this last variety being described as a distinct species under the name of *C-argenteum* by Mr. Kirby. An irregular wavy interrupted streak of brilliant green-blue scales extends across the hind wings forward of their hind border and is continued half way across the fore wings. This streak is irregularly margined with black and fades to faint green, and in some individuals can scarcely be discerned, especially upon the hind wings. The *body* is black with a brilliant green-blue reflection to the thorax and is clothed with tawny yellow hairs. The antennæ are black and alternated along their sides with white, and wholly white beneath, the knob being black and its tip straw yellow.

Though this butterfly has been met with from the latitude of Lake Winnipeg to the southern West India islands, and from the Atlantic to the Pacific coast, it does not anywhere appear to be numerous, and will probably seldom if ever occur in our gardens in such profusion as to do any appreciable injury. Indeed most persons will desire to cherish and protect these pretty "winged flowers," and domesticate them as much as possible in the yards around their dwellings, rather than to destroy and expel them. Although their larvæ covered with prickles have a repulsive aspect, they all disappear from the currant bushes before we have occasion to go near them to gather their fruit. Should these worms however become so numerous in any instance as to be detrimental, picking off each leaf on which they are stationed and crushing it beneath the foot will probably be found the only effectual mode of destroying them.

143. WHITE-C BUTTERFLY, *Vanessa (Grapta) C-album*, Linn.

Eating the leaves the fore part of August, a prickly worm very similar to the preceding, but of a brownish red color in front and white or pale yellow posteriorly, its pupa state continuing about sixteen days and the butterfly appearing in September, its wings scalloped, the hind pair tawny yellow shaded to dusky brown on their hind margin and with a black spot on their centre as well as two others towards their base, and on their under sides with a central silvery curved mark like a letter C. Width about 2.00.

Like the *Vanessa Antiopa*, *Atalanta* and several other butterflies, this species is common to both sides of the Atlantic. Dr. Harris

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regarded our American insect as different from the European, and accordingly named it *V. comma*. He supposed the wings to be more deeply scalloped or indented in the European than they are in the American butterfly and that the specimens of the two continents could at once be distinguished by this mark. But how perfectly fallacious this character is will appear from the remark of Mr. Westwood (Humphrey's British Butterflies, p. 50) who, in describing the European insect observes, "This species is subject to an extraordinary variation in the form of its wings. In some specimens the incision in the outer (posterior) margin of the fore wings is so deep that it forms nearly a semicircle, whilst in others it is scarcely more than a sextant; the other indentations being equally varied." Our American specimens vary in the same manner, the principal incision in the fore wings being much deeper than the sixth part of a circle in every instance which I have before me. And on comparing them on the one hand with the descriptions which European authors give of *C-album*, especially that of Mr. Westwood which is most detailed and clearly expressed, and on the other hand with the description which Dr. Harris gives of *comma*, every one must admit that, of the two, the former is plainly the species to which our insect pertains. In every particular they coincide most perfectly with the characters assigned to that species. And when in addition to this we recur to their habits, the larvæ subsisting upon the same kinds of vegetation and two broods coming out each year, not a peg remains on which to hang a doubt as to the identity of our American insect with that of Europe.

In England this has obtained the common name of the Comma butterfly, and Dr. Harris describes it as having a silvery comma beneath, upon the middle of the hind wings. But in each of the several examples which have come under my notice this mark very exactly resembles a letter C and not a comma. A translation of its technical name will therefore designate it more explicitly than the common name which we meet with in English books. In all its marks except those which we have specified above, it is nearly or quite identical with the Progne butterfly. The under side of its wings, however, are occupied only in places by transverse black streaks.

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The larvæ have as yet been noticed in this country only upon the hop and the elm; but in addition to these it in England has been found feeding upon the nettle, gooseberry, currant, honeysuckle, hazle and willow, and will probably be found upon the same vegetation here. The hop appears to be the plant of which it is most fond.

Two broods of this butterfly come abroad each year, the one in May, and the other mostly in September. Degeer has remarked that it probably passes the winter in the perfect state, as specimens are observed in the first days of spring. I once met with it on the nineteenth of April, before warm weather had sufficiently advanced, it would seem, to have disclosed it from the pupa that season. And as the black *Antiopa* butterfly is occasionally met with torpid in its winter quarters, beneath a board or in the cavity of a decaying log and similar situations, where, though for months buried deeply under the snow, it will remain dry and in safety, to come abroad from its solitary cell upon the first warm days of spring, so it is quite probable some individuals of this species also, hatching from their pupæ late in autumn may go into winter quarters and reappear upon the wing early in the following spring. But these can only be regarded as exceptions to the general rule, for it is not till the beginning of May that we commonly meet with this butterfly. I have captured it much oftener than the preceding species, although it is probably no more common. It falls into the collector's hands more frequently, as it comes abroad twice in the season and makes its first appearance when there are but few insects to be gathered.

The CECROPIA EMPEROR MOTH No. 33, in its larva state a very large pale green worm with blue and yellow prickles, is occasionally found upon the currant eating the leaves.

The WHITE MILLER No. 125, its larva a large caterpillar covered with soft pale yellow hairs, feeds upon the currant leaves also.

144. PALE HISPA, *Uraplata pallida*, Say, (Coleoptera. Hispidæ.)

Blister-like spots upon the leaves, in which is a small tapering flattened worm, feeding upon the green pulpy substance of the

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leaf leaving the skin entire, producing a beetle which occurs upon the bushes in May and June, its wing covers of an oblong square form with elevated lines and intervening rough grooves, its color light yellow, black beneath and with the antennæ, the sides and two stripes on the thorax and variable lines on the wing covers also black. Length 0.15. As I have commonly met with this beetle upon the wild black currant, I infer with considerable confidence that its larvæ subsist upon the leaves, mining them as the Rosy Hispa No. 37 does those of the apple.

145. CURRANT APHIS, *Aphis Ribis*, Linn. (Homoptera. Aphidæ.)

Irregular bulges or blister-like elevations of a brownish red color upon the leaves, opposite which on their under sides are corresponding hollows occupied by multitudes of plant lice sucking the juices of the leaf and sometimes covering the green succulent young shoots also; many of them without wings and of a pale yellowish color; others with clear glassy wings, and these mostly black with the abdomen light green and having a slightly protruded tail and black horns or honey tubes reaching about half way to the tip, with a row of deep green or black dots along each side forward of the horns, the antennæ and legs also black with the shanks and bases of the thighs pale, and with the third oblique vein of the wings obliterated at its commencement. Length 0.13 to the tips of the wings. More or less common in every garden, attended by ants and devoured by lady-birds (*Coccinellæ*) which are always seen on the same bushes, and which with other destroyers often wholly exterminate these lice so that only the bulged spots on the leaves remain to indicate their having been there.

146. OBLIQUE-STRIPED LEAF-HOPPER, *Erythroneura obliqua*, Say. (Homoptera. Tettigoniidæ.)

Puncturing the leaves and sucking their juices, a very small white leaf-hopper 0.12 long, its head and thorax with two bright blood-red or orange stripes and three short oblique ones on the wing covers, the outer one placed on the shoulder, the middle one on the disk and the inner one ending on the middle of the inner margin. This is common, particularly upon the bushes of the wild currant, but occurs on various other shrubs and trees

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throughout the year. Even in winter on turning over an old log one of these pretty little insects will sometimes leap into view from among the surrounding dead leaves. It is subject to considerable variations, the stripes being sometimes of a pale yellow color and one or another of them wanting. Commonly three black or dusky dots may be seen on the wing covers in an oblique row forward of the membranous tips.

The COMPANION LEAF-HOPPER of the raspberry, the THREE-BANDED LEAF-HOPPER 105, and several other species of this group will also be met with upon currant bushes.

11. THE GOOSEBERRY.—*Ribes Grossularia*.

Most of the insects which are found upon the currant are equally common upon the gooseberry, though the stalks of this shrub are so well defended by prickles that they are rarely if ever invaded by those borers which are so pernicious to the currant. In addition to the insects which are named under the currant, the following have been observed upon the gooseberry only.

147. GOOSEBERRY BARK-LOUSE, *Lecanium Cynosbati*, new species. (Homoptera. Coccidæ.)

On the stalks of the wild gooseberry (*R. Cynosbati*), a hemispheric, smooth, shining resin-brown scale, commonly freckled with dull yellow dots and with a dull yellow stripe along its middle. Length about 0.15. This is evidently a different species from that which we have found upon the currant.

148. MEALY FLATA, *Paciloptera pruinosa*, Say. (Homoptera. Fulgoridæ.)

In July and August, puncturing and sucking the juices of the leaves and the young succulent shoots, a four-winged fly which is strongly compressed and wedge-shaped, its height almost double its width, of a dusky bluish color covered with white meal-like powder, its legs straw-yellow, and its wing-covers showing some faint white dots and near their base three or four dusky ones. Length about 0.30.

Ten years ago a gooseberry and pie-rhubarb growing contiguous to each other in the yard in rear of the old State Hall in Albany

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were thronged with this insect in the different stages of its growth. This is the northern-most point where it has yet been discovered. The preceding year the privet (*Ligustrum vulgare*) in gardens in the city of New-York was overrun with it, and a description of it was published in the New-York Farmer and Mechanic newspaper, of July 30, 1846, by Issachar Cozzens, under the name *Flata Ligustrum*, he being unaware that it had previously been named by Mr. Say. Further south it is quite common on various shrubs.

149. GOOSEBERRY MOTH.

(Lepidoptera. Tineidæ ?)

The fruit when about half grown perishing, its interior being ate out by a slender greenish worm about half an inch long with a dark colored nose, a dark band across the top of its neck, and the three forward pairs of feet of the same color, which forms a tube of silken threads from the cavity in the berry through a hole in its side to an adjacent leaf, through which it crawls out and in.

This is too interesting and important a depredator upon the gooseberry to be passed unnoticed, although I have not yet obtained it in its perfect state, it having generally completed its work and left the bushes before its destructive operations were observed. I have sometimes seen bushes of the wild gooseberry with every berry withered and reduced to a mere dry hollow shell with a cobweb-like tube protruding from the orifice in one side. And the present summer a letter to the Country Gentleman from E. Graves, jr. of Ashfield, Mass., states that for three years past, his "Houghton's seedling" gooseberries have been a total failure, from this same worm, as I am assured by the account which he gives of it and the specimens accompanying his letter.

150. GOOSEBERRY MIDGE, *Cecidomyia Grossulariæ*, Fitch. (Diptera. Tipulidæ.)

The berries turning red prematurely and becoming putrid, and having in them small bright yellow maggots of an oblong oval form and slightly divided into segments by fine impressed transverse lines; changing to pupæ in the berries and the latter part of July giving out a small two-winged fly resembling a musketo, of a beeswax-yellow color, its wings hyaline and slightly smoky, and its antennæ blackish and twelve jointed. Length 0.10. See Transactions, 1854, p. 880.

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12. THE HICKORY.—*Carya alba et al.*

The several species of hickory and walnut are all preyed upon alike by the same insects with a very few exceptions, and these trees suffer much more from their attacks than any of our other wild fruit trees. In the state of New-York are upwards of sixty insect depredators belonging to these trees. Only a part of these, however, are yet known to us in their perfect state so that we are able to name and describe them.

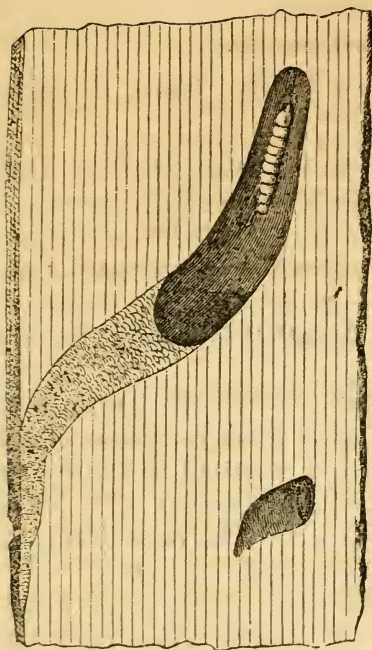
AFFECTING THE TRUNK AND LIMBS.

151. TIGER CERAMBYX, *Goes tigrina*, Degeer. (Coleoptera. Cerambycidae.)

Boring large holes lengthwise in the solid wood, a large cream-yellow grub, slightly tapering, with a faint darker line along the middle of its back, a black head chestnut-brown at its base, and the first ring flattened and pale tawny yellowish; changing to a pupa in the burrow it excavates (as do all other borers of the beetle kind), and producing a long-horned beetle of a brown color covered with incumbent short tawny gray pubescence, more dense on the wing covers, which have a broad dark brown band beyond their middle and another on their base. the thorax with an erect blunt spine on each side, and the antennæ pale yellowish with their first joint dark brown. Length about one inch. This is the common borer in all the hickory and walnut trees in my neighborhood. Those species of the old genus *Monohammus*, in which the feelers are blunt instead of pointed at their ends, have recently been set off into a distinct genus by Dr. Leconte, to which the name *Goes* is given. See Transactions, 1854, p. 850.

The annexed cut handsomely illustrates the principal operations of this insect; and those of the Apple-tree borer and other large borers belonging to the family Cerambycidae are closely analogous to this. On the left hand side of the figure near its lower end is seen a small cavity which the parent beetle gnaws through the hard dead outer layers of the bark, and a small perforation through the soft new inner layers. Does the parent drop her egg in the bottom of the cavity which she gnaws, and does the young worm eat its way through the soft inner layers to the

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wood? or does she bore through these layers with her ovipositor and place her egg under the bark and upon the outer surface of the wood? The Apple-tree borer deposits her egg upon the outside of the bark, according to the observations of Esq. Baldwin, as related in my first report (Transactions, 1854, pp. 717, 718). But according to the statements of my esteemed fellow townsman, Wm. McKie, Esq., who has had the misfortune of having much experience with this insect, the results of which were communicated by him to the Horticulturist, published at

Rochester, a few years since, the parent insect pierces through the bark and places her egg in contact with the wood. It is probably impossible to decide from an inspection of the perforation in the bark, whether it has been made by a minute worm which has gnawed its way through the bark, or has been pierced by the boring apparatus of the parent insect. It is only by seeing the egg in place before it is hatched, or by finding the infantile worm on its way through the bark that this point can be settled. The young worm lives at first upon the soft outer layers of the sap wood, mining a shallow cavity all around the orifice in the bark, and the bark dies and turns black as far as this burrow extends. Its jaws having at length become sufficiently strong, it gnaws its way into the solid wood from the upper part of its burrow under the bark, boring obliquely inward and upward, all the lower part of its burrow being commonly packed with its sawdust-like chips. Finally, having completed its growth, it extends the upper end of its burrow outward again to the bark, as shown in the cut heretofore given, Transactions, 1854, p. 851, which cut illustrates, on a diminished scale, the exit of this insect from the

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tree, as the one herewith presented shows its entrance and the lower part of its burrow, of the natural size.

- 152.** BELTED CERAMBYX, *Cerasphorus balteatus*, Degeer. (Coleoptera. Cerambycidae.) [Plate 1, fig. 8.]

A worm similar to the preceding and boring the trunk in the same manner, producing a more flattened long-horned beetle of a dusky brown color with a short dull straw-yellow band placed obliquely forward of the middle of each wing cover, and with a small sharp spine on each side of the thorax and two slender ones on the tips of each wing cover. Length 0.60 to 1.10. See Harris's Treatise, p. 86.

All our American authors have entered this species under Drury's name *cinctus* or the still later name *garganicus* of Fabricius. Although it was figured and described in Drury's first volume, the name was not given till the appendix of his second volume was published. The name given it by Degeer (Memoirs, vol. v. p. 111) thus appears to have preceded all others.

It is difficult to decide upon the most suitable common name for many of our insects. In those instances where the generic name is long and difficult of pronunciation by persons not classically educated, and where this name cannot readily be translated, I have deemed it better to fall back upon the family name, thus following the example of recent English authorities in the smaller Lepidoptera and several other groups.

- 153.** DISCOIDAL SAPERDA, *Saperda discoidea*, Fab. (Coleoptera. Cerambycidae.)

A similar but much smaller worm than the foregoing, changing to a cylindrical long-horned beetle of a black or blackish-brown color, clothed with ash-gray pubescence which is less dense above and commonly forms three gray stripes upon the thorax and a band or crescent upon the middle of the wing covers, its legs being yellow or reddish. Length 0.40 to 0.60.

- 154.** BANDED SAPERDA, *Oncideres cingulatus*, Say. (Coleoptera. Cerambycidae.)

A worm similar to the preceding and producing a similar beetle but distinguished chiefly by having its wing covers sprinkled over with faint tawny yellow dots. Length about 0.60.

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- 155.** SLENDER-FOOTED DYSPHAGA, *Dysphaga tenuipes*, Haldeman. (Coleoptera. Cerambycidae.)

Small grubs in the dead limbs and twigs, producing in May a small black long-horned beetle with rough wing covers but half as long as the abdomen and tinged with paler yellowish at their bases, its head having a furrow in the middle and its thorax cylindrical. Length 0.25.

- 156.** LURID BUPRESTIS, *Dicerca lurida*, Fab. (Coleoptera. Buprestidae.)

Mining shallow burrows in the sickly dying limbs, a long tapering yellowish white grub, its second ring very broad and strongly flattened, its head small and brownish, producing a blackish brassy snapping-beetle which may be found upon the trunk and limbs through the summer, its surface rather rough and with coarse punctures running into each other, its wing covers with raised lines on their inner part and two toothed at their tips, the end of the abdomen having three teeth and its under side being more brilliant brassy and with punctures opening backward. Length about 0.70. See Harris's Treatise, p. 43.

- 157.** WALNUT ANT, *Formica Caryæ*, Fitch. (Hymenoptera. Formicidae.)

Mining long narrow passages in the interior of the trunk and limbs and staining the adjacent wood light brown; a longish black shining ant, its abdomen with equidistant transverse rows of fine bristles, two rows upon each segment. Length 0.20 to 0.33. See Transactions, 1854, p. 855.

- 158.** RED-SHOULDERED APATE, *Apate basillaris*, Say. (Coleoptera, Bostriichidae.)

Boring small holes straight towards the heart of the tree, small fleshy white six-footed grubs with backs transversely wrinkled; changing to pupæ at the inner ends of their burrows, and producing small cylindrical black beetles covered with punctures, with the fore part of their thorax very rough and their wing covers with a tawny red or yellow spot on their base, their tips abruptly cut off obliquely, the margin of the declivity showing two or three little teeth on each side above and an elevated line below. Length 0.20 to 0.25. See Harris's Treatise, p. 81.

HICKORY. BARK.

AFFECTING THE BARK.

159. FOUR-BRISTLED MITE, *Oribata quadripilis*, new species.
Acaridæ.)

(Aptera.

Under the loose scales of the bark, a broad oval mite of a shining resin-brown color and slightly transparent, with four small bristles projecting forward in front. Length 0.02.

Though our knowledge of the habits of this mite is very limited and we are not able to say whether it is an injurious species, it still merits a short notice in connection with the other insects which occur upon the bark of the hickory. The Hickory ant which has been mentioned above, in addition to occupying cavities in the interior of the tree is met with also under the loose scales of the bark, in which situation numbers of them may be found crowded together and torpid, in the winter season. And associated with it a small mite will frequently be found, which appears to be closely related to the *Oribata bipilis*, described by Hermann from specimens discovered upon the bark of a tree in Germany. This mite is oval and about half as broad as long, somewhat depressed, polished and shining, of a resin-brown color and slightly transparent like resin. It has in front four projecting bristles of nearly equal length, the lower two curving inward, the other two straight, and a few bristles occur scattered over the body. The legs are also clothed with hairs of unequal length, and at the tip of each shank is a long bristle extending outward over and projecting beyond the feet. The four anterior thighs also have a shorter bristle at their tips, projecting outward parallel with those of the shanks. The four anterior legs are of equal length and somewhat longer than the hind ones, and the articulating part of their base is very narrow and slender. Their thighs are of an elongated ovate form, being strongly inflated into a kind of knot at their bases. In the winter season little groups of these mites are found clustered together in the crevices of the bark, torpid, but reviving when brought into a warm room and thereupon crawling about, though very slowly and awkwardly, the long bristles protruding out beyond the ends of its feet evidently serving to aid it in clinging to the surface over which it walks but at the same time impeding it from any briskness in its movements.

HICKORY. BARK.

- 160.** HICKORY BARK-LOUSE, *Lecanium Caryæ*, new species. (Homoptera. Coccidæ.)

Fixed to the bark of the small limbs, a large, very convex oval scale of a black color fading to chestnut-brown, in May dusted over with a white powder. Length often 0.40 by 0.25 in width.

- 161.** HICKORY BLIGHT, *Eriosoma Caryæ*, new species. (Homoptera. Aphidæ.)

The under sides of the limbs particularly of bushes and young trees in shaded situations coated over with a white flocculent down, covering and concealing multitudes of woolly plant-lice which are crowded together upon the bark, sucking its juices; the winged individuals of a black color, with the head, scutel and abdomen covered with a white cotton-like substance, their wings somewhat hyaline, the forward pair with an oval salt-white spot or stigma towards the tip of their outer margin, their veins all very faintly traced or abortive. Length to the tip of the wings 0.12.

I have never noticed this blight in the state of New-York, though it no doubt occurs here. It was found common upon walnut bushes growing along Henderson river in Illinois, a few years since.

- 162.** HICKORY APHIS, *Lachnus Caryæ*, Harris. (Homoptera. Aphidæ.)

In clusters on the under sides of the limbs in July and August and probably to the close of the season, puncturing the bark and extracting its juices, an unusually large plant-louse, 0.25 long and to the tips of its wings 0.40, its spread wings measuring 0.72, its body of a black color coated over with a bluish white powder like the bloom upon a plum, its antennæ reaching to the base of the abdomen, black and evenly bearded with shortish hairs, as are the legs also, the thighs being clear tawny red; wings hyaline, smoky at base and along the outer margin, their veins black, the rib vein and two first oblique veins very thick and margined with smoky, the third oblique vein and its two forks and the short fourth vein very slender. See Harris's Treatise, p. 208.

This species clearly pertains to the genus *Lachnus* as now restricted and admirably elucidated in the invaluable volume of Koch.

HICKORY. LEAVES.

AFFECTING THE LEAVES.

1. *Forming galls and other excrescences.*

163.. HICKORY-STEM GALL-LOUSE, *Pemphigus Caryæcaulis*, Fitch. (Homoptera. Aphidæ.)

Forming bullet-like galls, hollow, green and of a leathery texture, upon the leaf stalks and succulent young shoots, with the walls of the cavity inside covered with minute white and yellow lice; the perfect, winged insect not yet discovered; the gall subsequently turning black, opening and becoming cup-shaped. See Transactions, 1854, p. 859.

164. HICKORY-VEIN GALL-LOUSE, *Pemphigus? Caryævenæ*, new species.

Forming plaits in the veins of the leaves, which project up from the surface in an abruptly elevated keel-like ridge upon the upper side of the leaf and with a mouth opening on the under side, the lips of which are woolly and closed.

Although the Aphis which produces these plans in the veins of hickory leaves is unknown to us in its winged state, its work will suffice to distinguish it from other species. The plaits occur mostly near the middle of the leaf, upon one side of the mid-vein, occupying the bases of the lateral veins, two or three of which are commonly enlarged into these excrescences or galls, which jut up in keel-like ridges from a quarter to a half inch in length. These ridges are of a pale yellow color, turning brown and becoming dry and dead after a time, and frequently before they perish the portion of the leaf between them withers and turns brown, in which case the inhabitants of the gall forsake it, being no longer able to obtain a due supply of nourishment from its walls. The lips of the mouth which opens on the under side of the leaf are covered with white or pale tawny yellow wool. They are pressed together, but a small orifice is open at their outer end, through which some of the young lice frequently crawl from the interior of the gall and station themselves upon the under surface of the leaf by the side of the mid-vein. The lips are readily drawn apart, exposing the cavity within, the walls of which are covered with minute wingless females and their eggs and young. The females are egg-shaped, broadest anteriorly and tapering behind to an acute but not an attenuated point. They are 0.03

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long, 0.02 broad, very pale yellow and at the tip watery white. The eyes appear like two minute brown dots widely separated, the head being short and broad with the transverse sutures between it and the other segments of the body very slight and indistinct. The legs and antennæ are short and tinged with dusky. The antennæ are three-jointed, the basal joint thickest and about as broad as long, the second joint globular and the third elongated and cylindrical, with a projecting point upon one side at the tip. When moving about the antennæ appear to be employed as a fourth pair of legs, their points being pressed to the surface over which it is passing, similarly to the feet. The eggs are small oval shining grains of a watery yellowish white color. The young larvæ are intermediate in size between the eggs and the females, and resemble the latter except that they are of an oval form and their beaks are proportionally longer reaching to or slightly beyond the tips of their bodies.

These excrescences are common upon hickory leaves throughout the summer season.

165. HICKORY THRIPS, *Phlæothrips Caryæ*, new species. (Homoptera. Thripididæ.)

Slender conical protuberances like the spur of a cock a quarter of an inch long, standing out perpendicularly from the under surface of the leaf and closed at their end, with a similar protuberance upon the opposite side of the leaf having its end open and split into several long slender teeth; within these galls a small slender shining black insect with the middle joints of its antennæ honey-yellow and its long narrow white wings appressed to its back.

Whether these singular galls, which resemble a long slender pod thrust half way through the leaf, are produced by the Thrips found in them, or by some other insect which forsakes them before this takes up its abode there, I am unable to say. In the instance in which I noticed them particularly, they occurred upon a young shag-bark hickory in the month of September. Quite a number of the leaves had one and several had two or more galls growing upon them, in each one of which was one or more of these insects or their larvæ. The galls were of a very tough leathery texture, green where they adjoined the leaf and deep purple at

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their ends, though most of them at that date had become dry and faded to a dark brown color. The leaf is often wrinkled around the gall and has more or less of a fold extending from thence to its outer edge. The insect within, when disturbed, turns its tail upward over its back in a menacing manner, the same as the rove beetles (*Staphylinidæ*) do; and when the point of a needle which has been pressed upon one of these insects is touched to the tip of the tongue, unless my imagination greatly deceives me, it will frequently be found to impart a peculiar acrid biting sensation. This insect is 0.07 long, of a deep black color and highly polished. Its head is narrower than the thorax and nearly square. The third, fourth and fifth joints of the antennæ are longer than the others, yellow and slightly transparent; the last joint is shortest and but half as thick as those which precede it. The abdomen is egg-shaped with its tip drawn out into a tube thrice as long as it is thick, with four long bristles at its end, and the abdomen is furnished with bristles at each of its sutures. The wings do not reach the tip of the abdomen. They are white and slightly transparent and fringed with black hairs. In its larva state it has a more slender linear form with a dull greenish yellow head, a white thorax with a broad black band anteriorly, a pale red abdomen with a black band at its tip, and whitish legs.

166. HICKORY LEAF WITHERER, *Phylloxera Caryaefoliæ*, new species. (Homoptera. Aphidæ.)

Forming small conical elevations on the upper surface of the leaf, each having an orifice in its summit; a very small black plant-louse with a pale abdomen and legs and smoky wings laid flat upon its back, and having only three veins in addition to the rib. Length 0.06.

The protuberances formed by this plant-louse are about 0.15 high and 0.20 broad at their bases, of a conical form and a dull red or lurid brown color surrounded by a light yellow ring which occupies the substance of the leaf for a short distance around the base of each cone. The apex of the cone is fimbriated or cleft into a number of small teeth which turn outwards, and in the centre between the bases of these teeth is a small orifice leading into a cavity inside of the cone, the walls of which are scarcely thicker than paper, but are very tough like leather. Some leaves

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have only one of these conical galls upon them, others have two, three or more. As many as a dozen may be found upon some leaves. And wandering about upon the surface of the leaf the mature winged flies will be found, which have crawled out from the gall in which they were nurtured, and in which multitudes of young lice in all the stages of their growth will be found crowded together and covering the walls of the cavity, with a few newly hatched winged individuals similar to those seen outside of the gall, but smaller and lighter colored, the whole of their body being pale yellow or with only a dusky band between the bases of their wings. As soon as they leave the gall, however, and expose themselves to the light and air, they change to a black color, the abdomen only remaining pale yellow often tinged with green. Some individuals may be observed in which the change in their colors is not fully completed, showing a pale yellow band upon their necks. Their legs are short and pale with black knees and feet. The antennæ are short, thick and thread-like, scarcely longer than the head, and with but three or four joints, difficult to discern. The wings are placed horizontally upon the back and not elevated as in most of the plant lice. They are smoky-transparent with a more dusky spot or stigma on the outer margin between the tip of the rib-vein and the outer edge, the rib-vein being perfectly straight and not curved as in other plant lice to give a greater width to this stigma-spot. In addition to the rib-vein the fore wings have only three oblique veins, all of which are straight and black. The first of these is placed forward of the middle of the wing and runs from the rib-vein to the inner margin. The last one runs from the stigma to the tip of the wing and is abortive or imperceptible at its base where it starts from the stigma. The middle vein is parallel with this last and starts from the first vein above its middle and reaches the inner margin equidistant from the tips of the other two, its base being abortive for a short distance. The hind wings form a very conspicuous angular point on the middle of their outer margin and have a longitudinal rib-vein but are wholly destitute of any oblique vein running from it to the inner margin.

From what has now been stated it will be seen that this small insect presents some notable peculiarities. We have a second species,

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belonging to the oak, which is perfectly congeneric with it. None of the figures in Koch's works correspond with these insects, and the genus to which they pertain is evidently unknown to him. But on gathering from different sources the details of the European plant-louse named *Quercus*, on which the genus *Phylloxera* has been founded by Fonscolomb, we find such a full coincidence as to assure us that our insects are congeneric with that species. We cannot but deem that the observation of M. Amyot (Ann. Soc. Ent. 2d series, v. p. 485), that in that species the three oblique veins arise directly from the outer margin of the wings, is inexact, as such a structure would be a perfect anomaly among the species of this family. Should that character, however, be as stated by M. Amyot, our insects would constitute a new genus, since in them the usual longitudinal rib-vein from which the oblique veins are given off is perfectly distinct.

2. Puncturing the leaves and sucking their juices.

167. HICKORY GAY LOUSE, *Callipterus Caryellus*, Fitch. (Homoptera, Aphidæ.)

Scattered upon the under sides of the leaves, a small pale yellow plant-louse with white antennæ alternated with black rings, and pellucid wings laid flat upon its back, its abdomen egg-shaped, somewhat flattened and with only minute rudimentary honey tubes. Length 0.12. See Transactions, 1854, p. 869.

This and the four following species of very small delicate bright-colored plant-lice inhabiting hickory leaves were described in my First Report, at which time I remarked that they with other similar insects occurring on oaks and other trees formed a group so very distinct from the common species of the genus *Aphis* that they would probably be regarded as entitled to the rank of an independent genus. The same year in which that Report was published the portion of M. Koch's beautifully illustrated work (*Die Pflanzenlause Aphiden*) in which a few European species similar to these is given, made its appearance. These insects are therein formed into a new genus, to which the name *Callipterus*, i. e. beautiful winged, is given. And the European *C. Juglandicola* of Koch appears closely related to this present species, though sufficiently distinguished from it by the black

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rings upon the antennæ, which are always broad in our insect and are one of the first marks which the eye notices, but are represented as quite narrow and inconspicuous in the European. This is common upon hickory leaves; but the insects of this genus do not crowd themselves together and remain stationary like other plant lice.

168. DOTTED-WINGED GAY-LOUSE, *Callipterus punctatellus*, Fitch.

A plant-louse like the preceding, but with black feet and a black dot on the base and another on the apex of each of the veins of its fore wings. Length 0.12. See Transactions, 1854, p. 869.

169. SPOTTED-WINGED GAY-LOUSE, *Callipterus maculellus*, Fitch.

A plant-louse like the preceding, but with the veins of the fore wings margined in part with smoky and a black band near the tips of the hind thighs, the black rings upon the antennæ narrow. Length 0.12. See Transactions, 1854, p. 870.

170. SMOKY-WINGED GAY-LOUSE, *Callipterus fumipennellus*, Fitch.

A plant-louse similar to the preceding, of a dull yellow color with blackish feet and the wings smoky with coarse brown veins. Length 0.13. See Transactions, 1854, p. 870.

171. BLACK-MARGINED GAY-LOUSE, *Callipterus marginellus*, Fitch.

A plant-louse similar to No. 166 but with a black stripe along each side of the head and thorax, and on the outer margin of both pairs of wings. Length 0.15. See Transactions, 1854, p. 870.

172. FRECKLED LEAF-HOPPER, *Jassus irroratus*, Say. (Homoptera. Tettigoniidæ.)

A cylindric oblong white leaf-hopper closely inscribed and reticulated with slender black lines and small dots which form irregular spots along the margins of the wing covers, its legs white dotted with black. Length 0.25. Whilst several of its kindred draw their nourishment from grass and growing crops of grain this very common species is usually found upon the leaves of a variety of bushes, oftener upon those of the walnut and hickory than any other kind, according to my observations.

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173. FOUR-STRIPED LEAF-HOPPER, *Tettigonia quadrivittata*, Say. (Homoptera. Tettigoniidæ.)

A flattened oblong leaf-hopper of a light yellow color, varied on the thorax with orange, red or dusky, its wing covers olive green each with two bright red or orange stripes, the tips margined with black. Length 0.35. This pretty insect, like the preceding, occurs upon a variety of other bushes in addition to the walnut.

174. WALNUT SWORD-TAIL, *Uroxiphus Caryæ*, Fitch. (Homoptera. Membracidæ.)

A dull brown tree-hopper with the terminal portion of its wing covers obscure ash-gray, its abdomen and a ring on its shanks pale yellowish, and its breast mealy white. Length 0.30, the female 0.37. This is a somewhat common insect, which I have found only upon the walnut.

175. ONE-COLORED TREE-HOPPER, *Tilamona unicolor*, Fitch. (Homoptera. Membracidæ.)

A tree-hopper of a uniform dull ochre yellow color and somewhat like a beechnut in shape and size, with a prominent hump jutting up on the middle of its back, highest anteriorly and descending with a slight curve to its hind angle which is very obtusely rounded and but little prominent, its anterior angle also rounded and with only a slight concavity below it at the forward end of the hump, whilst at its posterior base is a strong one, the whole surface with close coarse punctures and showing a few elevated longitudinal lines low down on each side and towards the tip; the upper edge of the hump black and also the tip of the abdomen on its under side; wing covers glassy with a black spot on their base and tip and their veins margined with slender black lines. Length 0.45, height 0.25. A variety (*irrorata*) occurs, of a paler grayish yellow color freckled with numerous pale green dots in the dried specimen. This is a rare species which I have only met with in a few instances, always finding it on walnut bushes.

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176. BANDED TREE-HOPPER, *Telamona fasciata*, Fitch.

A tree-hopper resembling the preceding in its form, but smaller and of a tawny yellow color, its head and the anterior margin of the thorax and the under side paler cream-yellow or straw-colored with a single small black dot above each eye; its thorax in front and at tip blackish and also an oblique band across the hind end of the dorsal hump and a spot on the tips of the wing covers; the dorsal hump more long than high, longer at its base than above, highest anteriorly, with a stronger concavity at its anterior end than at its posterior and at its anterior base compressed and forming hereby a shallow indentation upon each side. Length 0.38, height 0.20. This is also a rare insect, and as in kindred species, the black colors are often partially or totally obliterated, except the black dot above each eye.

The V-MARKED TREE-HOPPER (*Smilia vau*, Say), an extremely common and variable species is sometimes met with upon walnut bushes, but belongs to the oak, on which it is always found in abundance.

177. SHORT-HORNED TREE-HOPPER, *Ceresa brevicornis*, new species. (Homoptera. Membracidæ.)

This is so similar to the common Buffalo tree-hopper No. 22, that it will scarcely be distinguished from it except by a practiced eye, although it is undoubtedly a distinct species. It differs from that in having the horns much more short, and the sides of the thorax when viewed in front are not gradually curved outwards but are straight or rectilinear with the horns abruptly projecting from the corner at the upper end of this line. The acute spine at the tip of the thorax is also more long and slender. The thorax between the horns is slightly convex. The dried specimen is of a pale dull yellow color freckled with faint pale green dots and with a paler straw-colored stripe, quite distinct, upon the angular sides of the thorax from each eye upward to the horn and from thence to the summit of the thorax. Length of the female 0.36. It was met with upon hickory bushes in New-Jersey.

178. FACE-BANDED CIXIUS, *Cixius cinctifrons*, new species. (Homoptera. Fulgoridæ.)

A small four-winged fly of a white color varied with blackish brown and with three elevated lines upon the face and thorax, its

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face snow-white crossed by two black bands, the outer raised lines dotted with white in these bands; the thorax black, tawny yellow on each side beyond the raised lines; neck white with a row of blackish dots upon each side; wing covers smoky-brown, their veins dotted with black in places, their basal edge, an oblique band and a spot on the middle of the outer margin white, their membranous tips white and somewhat hyaline, with a brown band across the transverse veinlets and the hind margin blackish interrupted by the snow-white tips of the veins; wings black and transparent; under side yellowish-white with two blackish bands on each of the four forward shanks. Length of the male 0.18. This was taken in company with the preceding, the middle of September. It may possibly be a variety of the *F!ata nava* of Say, much more colored with black than in the specimens from which his description was drawn.

179. CLOUDY-TIPPED CIXIUS, *Cixius colapeum*, new species.

A small four-winged fly of a coal-black color with clear transparent wings having a large smoky-brown cloud on their tips; wing covers transparent, their veins dotted with black, the dots on the outer margin larger; an irregular and somewhat broken band of a smoky brown color extending across forward of the middle and a broader one beyond the middle, having a black spot or stigma on the anterior corner of its outer end; between these bands a smoky brown spot on the inner and a smaller one nearly opposite it on the outer margin; thorax with three raised lines; face black with the raised lines brown; legs dull whitish. Length 0.22. This also is a rare species.

AMYOT'S OTIOCERUS, No. 110. In each of the few instances in which I have met with this insect it has occurred upon walnut bushes.

The LARGE GREEN TREE BUG No. 99, is a common species upon hickory as well as on several other trees.

3. *Eating the Leaves.***180.** LUNA MOTH, *Actias Luna*, Linn. (Lepidoptera. Bombycidæ.)

In August, a large thick-bodied worm three inches long or more, of an apple-green color and its under side of a deeper or leaf-

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green hue, each segment with six small bright rose-red elevated dots, and low down along each side a pale yellow line running lengthwise immediately above the lower row of dots, from which line at each of the sutures a pale yellow line extends upwards upon the sides and sometimes is continued across the back, the head and six forward feet pale bluish green; spinning a whitish tough oval cocoon with rounded ends, 1.75 long, with leaves moulded to its outer surface; dropping to the ground in autumn and lying among the fallen leaves through the winter, giving out the moth the latter part of May; this of a delicate pea-green color, its body coated over with soft white wool, with a brick-red band across its anterior part and continued outward upon the forward edge of the fore wings nearly to their tips; each of the wings with a smallish eye-like spot near the centre, and the hind pair with their inner angles prolonged into tails which are nearly as long as the wings. Width 4.50 to 5.50.

It is a remarkable feature in the Insect Fauna of this country that we possess such a number of large showy moths of the group *Attacus* of Linnæus. Though the insects of the United States are generally so very similar to those of Europe and in some of the families are identical in many of their species, we here observe a notable difference. Whilst that continent furnishes only the three kinds of Peacock, the Tau and the rare *Cæcigena*, species of moderate size and but little diversified in their appearance, we have in the State of New-York alone eight of these elegant moths, nearly all of them vieing in size and magnificence with the most superb tropical products of this kind; and of a moiety of these the two sexes are so very dissimilar that in the cabinet they appear to form twelve distinct species. We have already presented some account of the *Cecropia*, No. 33, the *Promethea*, No. 80, and the *Io*, No. 81, and we here come to three others the larvæ of which occur upon the walnut.

Many persons on looking at these splendid insects in my collection have been much surprised on being informed that they were captured here in the State of New-York and that they are not rare species. They are very seldom seen, as they fly only by night and repose during the day time, clinging commonly to the sides of trees in groves and forests. This present species is less

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ornately adorned and diversified in its colors than the others. Its peculiarly delicate modest appearance causes many to rank it as "pre-eminent above all our moths in queenly beauty," and renders the name bestowed upon it by Linnæus most appropriate and happy, Luna being the Latin designation of the moon, the "queen of the night."

I have met with this feeding upon the beech as well as the walnut, and at the south it is also found upon the persimmon and the sweet gum. Varieties of the moth occur in which the fringe of the wings is wholly yellow or pale green, but commonly it is more or less of a rich purple or brownish red color along the middle of the hind edge of each wing. Some specimens have the margin of the hind wings sinuated or wavy from the tails to the outer angles. And another variety shows a darker streak more or less distinctly, forward of the hind border and running nearly parallel with it, at least upon the fore wings.

A Chinese species named *Selene* by Dr. Leach is almost identical with our Luna moth. So far as appears from a single specimen of this, sent me from Ningpo by Rev. M. S. Culbertson, the two insects can only be distinguished from each other by some of the minor details in the colors of the eye-like spots in the centre of their wings; varieties of the Luna occur which seem to coincide with the *Selene* in every other point.

The eye-like spots in these insects are situated upon the apex of the discoidal cell, and the transverse veinlet which bounds the outer end of this cell forms also the centre of the eye-like spot. In *Selene* this veinlet has only a slight narrow hyaline margin, whilst in Luna its margin is widened into an elliptic glassy spot; the eye thus appearing to be half opened in the latter and closed in the former. This central pupil is bordered on its forward or upper side by a rose-red crescent in both insects, the anterior or convex side of which is margined by an ochre-yellow line in Luna which is wholly wanting in *Selene*. Finally, in both insects this spot is surmounted by a coal-black crescent accompanied by a white or bluish-white line, which is placed upon the concave margin of the crescent in *Selene*, but inside of this margin in Luna, so that a black line here borders it upon its hind or concave side. On the opposite or under side of the central pupil in Luna is a broader and paler rose-red crescent than that upon the upper side, sometimes faded to a white color, and this is succeeded by a still broader sulphur-yellow one, whilst in *Selene* we see only a broad white crescent faintly edged exteriorly with yellowish. And outside of this in Luna is a slender black line prolonged from the horns of the anterior black crescent and forming with it a circular ring surrounding this eye-like spot

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whilst in *Selene* no such ring occurs. The spot on the fore wings is much narrower and of an elliptic form, but has all the parts of that upon the hind wings. In *Selene* this spot appears to be more distant from the fore margin of the wing than it is in *Luna*, and is destitute of the brownish red streak which we see in *Luna* extending from the outer corner of this spot obliquely forward to the border of the wing.

181. POLYPHEMUS MOTH, *Hyalophora Polyphemus*, Fab. (Lepidoptera. Bombycidae.)

In August and the fore part of September, a large thick-bodied worm closely resembling that of the foregoing species, 3.50 long and of an apple green color, not darker green beneath but having a pale yellow stripe along the middle on its under side, and on each segment six bright orange conical points, three on each side, with a sulphur yellow stripe from the lower to the middle one of these points, except on the anterior segments, and the upper points sometimes silvery on their outer sides; its head and six anterior feet of a clay-yellow color; crawling along the under sides of the limbs with its back downwards, its body being too heavy to be sustained in an upright posture; when at rest and contracted each segment strongly humped and forming an angular transverse ridge; constructing a cocoon in all respects like that of the *Luna* moth, which gives out the perfect insect the middle or latter part of May; this of a dull ochre or brownish yellow color with a glassy eye-like spot near the middle of each wing, crossed by a slender line and margined by a yellow succeeded by a black ring, which last is much broader on the hind wings and on its forward part is widened into a large cap-shaped spot as long as wide, with its concave end shaded into a bluish-white crescent; a dusky band faintly margined with white on its hind side crosses both wings forward of their hind margin, beyond which the ground color is commonly paler; anterior margin gray, which color is continued from the wings across the thorax in the form of a band. Width 5.00 to 6.50. A specimen in the collection of I. A. Lintner of Schoharie is much the smallest I have ever seen, measuring only four inches across its spread wings.

I have met with the larva of this insect on walnut, butternut, thorn and linden or basswood, and Dr. Harris (Treatise p. 298) records its occurrence on oaks and elms also. It sometimes attaches its cocoon partly to the side of a limb or sometimes with

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its silken threads draws two or three twigs together sufficiently to tie its cocoon between them, in which cases it does not fall to the earth with the fall of the leaves in autumn, but is very apt, by remaining exposed in the tree, to be perforated and have its inmate destroyed by woodpeckers.

It is remarkable that two insects which are so similar in their preparatory states that their larvæ differ only by slight and unimportant marks and their cocoons cannot be distinguished from each other still come to be so unlike each other in their perfect state as is the present species and Luna. The fact shows that the metamorphoses of the insects of this order is not so accurate a guide to their correct systematic arrangement as many have assumed it to be. This species having wings without tails and with glassy spots in their disk will pertain to Duncan's genus *Hyalophora*, but as the type of this genus (*Atlas*,) has the glassy spots large and angular, whereas here they are small, round and eye-like, it should probably form the type of a distinct genus.

The larvæ of this species and Luna are naked, except that fine hairs scarcely perceptible to the eye are scattered over the surface, at least upon the back, and one or two bristles are given out from each of the elevated dots. But I have met with larvæ upon the hornbeam and the butternut which I supposed to be the Luna, in which both when young and mature the surface was covered with numerous erect clavate scales, like short bristles gradually thickened towards their tips. Whether the moths from these larvæ are in any respect different from those which come from naked larvæ I hope to ascertain from specimens which are now in their pupa state.

182. REGAL HICKORY MOTH, *Ceratocampa regalis*, Fab. (Lepidoptera. Bombycidæ.)

In autumn, a very large apple-green worm, the largest larva in our country, measuring five or six inches in length and nearly an inch in thickness, with blue-black spots and rows of prickles and anteriorly several long orange-yellow horns tipped with black and studded with numerous black prickles, four of the upper ones longest, the head and feet also orange-yellow; lying under the ground in its pupa state through the winter, the moth coming

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out the beginning of July, of a bright red color with two yellow stripes on the thorax, its fore wings olive grayish or lead-colored with red stripes on the veins and light yellow oval spots mostly in a row parallel with the hind margin, the hind wings paler red with their anterior outer border and a large irregular triangular spot on their inner side light yellow. Width 5.00 to 6.00.

The larva of this splendid insect feeds upon the butternut and sumach as well as on the walnut and hickory, and at the south it is common upon the persimmon also. Its large size and long horns with branching prickles give it a truly formidable aspect, from whence it has acquired the name of "The horned devil" among the negroes at the south. It may be handled, however, without harm, as its prickles do not possess the power of stinging which belongs to those of the Io larva; and this frightful looking worm eventually becomes one of the largest, prettiest insects of our country. It is rarely met with in our State and only in its southern part. Some of its eggs sent in a letter from Philadelphia by Mr. George Newman enabled me to rear this insect and observe its transformations, and from these the specimen of the larva in the Entomological Museum of the Society was obtained. When reared in a colder climate than that to which it is native it is retarded beyond its usual period in completing its transformations, and thus its young do not have sufficient time to attain their growth before the season closes. It is therefore impossible to naturalize this elegant insect in the middle and northern parts of our State. The eggs sent me hatched mostly upon the 22d of July, and placed upon the sumach, the thriftiest one of the larva finished feeding and buried itself the 8th of September, but it was not till the 25th of the following July that the moth made its appearance. The pupa lies naked in the earth, without forming any cocoon. It is about two inches long and three-fourths of an inch in diameter, with rather deep transverse furrows at the sutures and wholly destitute of any rows of minute teeth. It has a small round elevation at its tip, like the head of a nail, and from the centre of this elevation two small blunt points project. It is of a bluish black color and the inside of the shell after the moth has left it is of a pale blue color and nacre-like, resembling the mother of pearl on the inner surface of a clam shell. When this moth

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first comes out it has a strong odor, exactly like that of opium, or the flowers of the poppy, and the pupa shell has the same smell also. It is common for the larger Lepidopterous insects when newly changed from their pupa state and before they take wing, to eject a few drops of an opaque fluid, which is usually of a red color. In former times, before this fact was known, a whole brood of a particular species happening to come out on a single night in summer has so covered the leaves and grass with these drops over a wide extent of country as to lead to the confident belief that a shower of blood had fallen—a phenomenon which superstition would naturally regard as an omen of most alarming portent. The fluid emitted by the Regal hickory moth is of a milk-white color and of the consistence of thin paint, and it is more copious than in any other insect I have reared, a single individual ejecting over a table spoonful.

183. HICKORY TUSsock Moth, *Lophocampa Carya*, Harris. (Lepidoptera. Arctiidae.)

In July and August, eating the tender leaves at the tips of the limbs, companies of snow-white caterpillars with rows of large black dots, and along the top of their backs eight black tufts of converging hairs and two black pencils of longer hairs towards each end; growing to an inch and a half in length and in sheltered corners and crevices spinning ash-gray oval cocoons with rounded ends, which give out the moth the following June, this being a pale ochre-yellow miller, its fore wings with roundish white spots edged with tawny yellow rings, the hind ones often united together and forming two or three rows parallel with the hind margin. Width 1.70 to 2.10. See Transactions, 1854, p. 863.

This caterpillar has been unusually numerous the present year, 1857. It has been tenfold more abundant than it was two years ago when my account of it was drawn up. And it proves to be a more general feeder than has been hitherto supposed. Though it evidently prefers the walnut, butternut and sumach, it is common on the elm and ash also, and I have even met with clusters of these caterpillars upon the tamerack or larch. As they approach maturity they separate and stray off to other trees, and may then be seen on rose bushes, on the apple, oak, locust, &c., the same individual often remaining several days in one place.

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It is not till the latter part of September that they finally disappear from the leaves.

The FOREST CATERPILLAR, a species resembling the Apple-tree caterpillar, No. 28, but making its nest against the side of the trunk instead of in the forks of the limbs, occurs on the hickory, but is more common on the oak, under which the description of it will be given.

The FALL WEB-WORM No. 88, and the V-MARKED MEASURE WORM No. 39, are also common upon the hickory. A singular shaped worm named THE SKIFF by Dr. Harris (Treatise, p. 323) and several other species belonging to the genera *Limacodes*, *Notodonta*, *Lophocampa*, &c., which are not yet known to us in their perfect state, also inhabit the hickory.

Of insects in their perfect state eating the leaves of the hickory, the large GOLDSMITH BEETLE No. 57, is the only one which has yet been noticed.

AFFECTING THE FRUIT.

184. HICKORY-SHUCK MOTH, *Ephippophora Caryana*, new species. (Lepidoptera. Tortricidæ.)

A slender white sixteen-footed worm about three-eighths of an inch in length mining the shucks which envelope the fruit, causing the nuts to be abortive and many of them to fall from the tree prematurely.

There are few persons who have gathered hickory nuts but have noticed this worm in some of the shucks and the cells which it has excavated therein, filled with little grains of a tawny yellow color. A specimen of the moth which comes from these worms, and the pupa shell from which it issued, was sent me by Mr. Lewis Potter of Easton, N. Y., in April last, with a letter stating that the insect entered its pupa state about the first of February and the moth came out the last of that month. This doubtless refers to the fruit when stored within doors, for larvæ which are lying on the surface of the ground, torpid or congealed by the winter's cold, undergo no changes.

The shell of the chrysalis or pupa is of a pale dull yellow color and shows upon each segment of the abdomen two rows of

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minute teeth with their points curved backward, those of each anterior row being larger.

The specimen of the moth being somewhat mutilated does not enable me to be perfectly certain respecting the genus to which it pertains, though everything indicates it to be an *Ephippophora*, of which genus we have several undescribed species in the State of New-York, some of them quite common. It is of a sooty black color, its fore wings with reflections of tawny yellow, blue and purple, their outer margin black with oblique triangular whitish streaks placed at equal distances apart, these streaks gradually becoming more faint anteriorly and disappearing for a short space at the base, and all of them except the last three double or in pairs separated only by a slender black line. A very oblique faint silvery blue streak extends inwards from the points of two of these white streaks, namely, the fourth and sixth ones from the tip of the wing; and the usual white spot on the inner margin of the wings in this genus is wanting in the present species. Its hind wings are silvery whitish on their outer basal half, the scales of the inner basal portion having a blue and a gray reflection, and their fringe is bluish white. The face and fore breast is cream-yellow, the hind breast and base of the abdomen hoary white, the third and following segments of the abdomen coal-black. Width of the spread wings, 0.60.

Mr. Potter states that in his own neighborhood this insect had been common for a few years and became so numerous in 1856 that several of the hickory trees scarcely produced a single nut. The present year, 1857, all our native fruit trees have yielded an unusual abundance of fruit, and I have not been able to find one of these worms whereby to render this account of them more exact. It is quite probable that, like many of its kindred, this moth will be numerous at times, and will then suddenly disappear, being destroyed by parasitic enemies, by unfavorable seasons, or other causes. Picking up and burning the infested nuts is probably the only mode whereby we can diminish its numbers.

185. LONG-BEAKED NUT WEEVIL, *Balaninus nasicus*, Say. (Coleoptera. Curculionidæ.)

A weevil with its remarkably long slender beak drilling a hole in the nut when it is young and soft and placing an egg therein,

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the worm from which feeds upon the meat and causes the fruit to fall, the worm finally boring out of the nut and burying itself in the ground to pass its pupa state, the beetle appearing in July and again the latter part of September, of a dark brown color coated over more or less with rusty whitish scales or short flat hairs, forming spots on the wing covers, which have punctured furrows, the thorax being black and densely punctured, the shanks chestnut-brown and the beak as long as the body and no thicker than a coarse bristle, polished and of a chestnut-brown color with a blackish tip, straight to its middle and from thence curved to its tip. Length 0.30 to 0.33 exclusive of its beak.

Worms seldom occur in hickory nuts in the State of New-York, but are common in them at the west. We meet with worms much more frequently in hazelnuts, chestnuts and acorns. A few attempts which I have made to rear some of these worms have been unsuccessful, nor was Dr. Harris any more fortunate in his efforts. Hence we are not certain as to the species which infest these respective fruits. Dr. Harris (Treatise, p. 65) states that he has met with this weevil upon hazelnut bushes. I have found another species similar to this upon the hazelnut, but have met with this species only upon the hickory at a distance of more than a mile from where any hazelnuts were growing. It appears probable, therefore, that this insect is not limited to one kind of nuts. The diseased hickory nuts show a small discolored spot upon their outer surface, and with a magnifying glass a round hole can be seen perforated in the centre of this spot, but closed up slightly within the nut. The meat inside is more or less eaten and the cavity thus made is filled with little brown and whitish grains, among which the worm is lying. It is a soft white grub, wholly destitute of feet, like the other larvæ of the weevil family.

The PLUM WEEVIL No. 70 is said by Mr. Say, on the authority of Wm. Bartram, to sometimes destroy the fruit of the walnut.

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13. THE BLACK WALNUT.—*Juglans nigra*.

THE LOCUST-TREE BORER (*Clytus Robinia*) is a common borer in the trunks and limbs of the black walnut, and the beetles which are reared in this tree appear to constitute a distinct variety of a larger size than usual and with their yellow marks changed more or less to a white color.

186. BLACK-WALNUT SPHINX, *Smerinthus Juglandis*, Abbot and Smith. (Lepidoptera. Sphingidæ.)

Eating the leaves, a large pale blue-green worm tapering in both directions from its middle and with a small head, a long horn at the end of its back and seven oblique white streaks along each side; when irritated making a creaking noise by rubbing the anterior joints of its body together; burying itself under ground through the winter and changing to a chestnut colored pupa with a rough granulated surface and six small tubercles upon its head; producing a narrow-winged moth of a drab gray, cinnamon-yellow or bluish lilac color, its fore wings crossed by four rusty brown lines, the two forward ones transverse the two hind ones parallel with the hind margin, and with a large square rusty brown spot on the middle of the inner margin between the two middle lines. Width 2.25 to 3.00. See Silliman's Journal xxxvi, p. 292.

14. THE BUTTERNUT.—*Juglans cinerea*.

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187. SPOTTED LEPTOSTYLUS, *Leptostylus macula*, Say. (Coleoptera. Cerambycidæ.)

Under the bark of old decaying trees, a grub similar to that of the Prickly Leptostylus No. 4, changing to a pupa in its cell and early in July giving out a small thick long-horned beetle of a brown or chestnut color with the sides of its thorax and a band on its wing covers ash-gray, the latter sprinkled over with coarse punctures and large blackish dots, the thorax on each side of its disk with a black stripe interrupted in its middle. Length 0.25

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to 0.30. The bark of old trees will sometimes be found everywhere filled with these grubs, which in the month of June may be seen changed to short thick pale-yellow pupæ with a few perfect insects that are newly hatched and have not yet left the tree.

188. BUTTERNUT BARK-LOUSE, *Aspidiotus Juglandis*, Fitch. (Homoptera. Coccidæ.)

Fixed to the bark of the twigs, minute pale brownish scales resembling those of the Apple bark louse No. 15, but smaller and not curved. This species was alluded to in my first report, Transactions of 1854, p. 739. I have not yet had an opportunity to trace out its history. Although this is so minute that the naked eye can scarcely discern many of the scales, it is preyed upon by a parasitic larva still smaller, which resides under the scale and feeds upon the eggs which the scale covers, changing to a minute four-winged fly of the family *Chalcididæ* in the order *Hymenoptera*, which gnaws a small round hole in the side of the scale through which to make its escape.

189. BUTTERNUT SCALE INSECT, *Lecanium Juglandifex*, new species. (Homoptera. Coccidæ.)

Adhering to the bark on the under side of the limbs, a hemispheric dull yellowish or black scale about 0.22 long and 0.18 broad, notched at its hind end, frequently showing a paler stripe along its middle and a paler margin and transverse blackish bands.

Whether this is the same insect with the European *Lecanium Juglandis* of Bouche, I am unable to ascertain, as I have at hand no description of that species. The details which I herewith present of our American insect will probably suffice to enable those who have an opportunity of observing that species to determine whether it is the same.

The male pupæ of this insect may be seen upon the limbs in May. They appear the same with the pupæ of other common species of this genus, being oblong oval, moderately elevated white scales about 0.10 long and half as broad, thin and somewhat hyaline, with a slender snow-white line running lengthwise along each side of the middle and uniting at their hind ends, with a similar line running transversely across the scale half way between its middle and its hind end. The male insects come out

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from these pupæ the fore part of June. They are long and narrow delicate two winged flies, measuring 0.05 to the tip of the abdomen and a third more to the end of their wings. They are of a rusty reddish color, the thorax darker and the scutel and head blackish, this last being separated from the body by a narrow pale red neck. The antennæ are slender and thread-like, half as long as the body, eight jointed, the basal joint thickest and as broad as long, the second joint narrower and scarcely longer than wide, the remaining joints cylindrical, the fourth slightly shorter than the others and the last rather longer than those which precede it. Two slender white bristles as long as the body are given off from the tip of the abdomen. The wings are transparent but not clear and glassy, and their rib-vein is very distinct and of a reddish color, ending before it reaches the margin of the wing.

The males of the several other species of the genus *Lecanium* which have been briefly alluded to in different parts of this Report will all be very similar to the one now described, differing only in their colors, the joints of their antennæ, and other minor points.

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190. TWO-MARKED TREE-HOPPER, *Enchenopa binotata*, Say. (Homoptera. Membracidæ.)

Puncturing the leaves and extracting their juices from July till the end of the season, a small rusty brown or black tree-hopper with two bright pale yellow spots upon its back, which part is prolonged forward and upward into a compressed horn rounded at its tip and giving the insect a resemblance to a little bird with an outstretched neck, and the four forward shanks broad, thin and leaf-like. Length 0.25 to 0.30.

This may always be found upon the butternut the latter part of summer. It occurs also, though less constantly, upon several other trees.

In my catalogue of Homoptera in the State Cabinet of Natural History, I referred this insect to the genus *Enchophyllum* of Amyot and Serville. Mr. Walker, I see, places it in the next genus, *Enchenopa*, of the same authors. It is too similar both in

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its form and spots to the Brazilian *Enchophyllum ensatum** to be generically separated from that species. Indeed the distinction between the two genera is much too slight and vague, in my view, to justify their division. In some of the species which authors place under *Enchenopa* the thorax appears to be as distinctly compressed, thin and foliaceous as it is in some of those arranged under *Enchophyllum*. The cells and veins of the wings are also the same in all these insects. It is therefore on good grounds that M. Fairmaire suppresses Dr. Burmeister's section *foliaceo-ensata*, the equivalent of *Enchophyllum* and includes all these insects under the one section, *ensata*. At the same time we view this group as too widely different and conspicuously marked by the horn-like protuberance of the thorax, to be retained under the genus *Membracis*. We would accordingly drop the name *Enchophyllum*, and include all these insects in the one genus *Enchenopa*, a term meaning sword-faced or sword-fronted, and which is therefore appropriate for all the species of this group.

191. BUTTERNUT TREE-HOPPER, *Ophiderma mera*, Say. (Homoptera. Membracidae.)

A greenish gray tree-hopper shaped like a half cone, with its apex bright chestnut-red and behind its middle a black band which is sometimes interrupted on the summit of the back, and with a blackish spot on the tips of the hyaline wing-covers. Length 0.36.

I have only met with this insect in a few instances, always upon the butternut. I could find no place for this species among the genera characterised by Amyot and Serville, and therefore proposed a new genus named *Caranota* in my catalogue of Homoptera in the State Cabinet of Natural History. This genus appears to be the same with that named *Ophiderma* by M. Fairmaire a few years before. The single species, *salamandra*, given as the type of this genus, is credited to the state of New-York, and ac-

* Upwards of a dozen individuals of this insect have fallen under my observation, all of which concurred in showing that it is the male sex which is described by Fabricius, whilst the females have been described by M. Fairmaire as a distinct species under the name *quinque-maculata*. A variety of the female occurs, which I name *intermedia*, in which the anterior spot upon the back is merely a faint cloud slightly paler than the ground, whilst the middle frontal spot is bright orange, as usual in this sex.

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According to the description is marked precisely like the *arcuata* of Say, but the dimensions assigned it are a fourth larger than those of that species.

192. OBTUSE CLASTOPTERA, *Clastoptera obtusa*, Say. (Homoptera. Cercopidæ.)

A short thick almost circular leaf-hopper of a gray color with fine transverse wrinkles and three brown bands anteriorly, its wing covers clouded with tawny brown with streaks of white and a coal black spot near their tips. Length 0.22.

From the middle of July till the end of the season this insect may frequently be met with on quite a number of different trees and shrubs. Although the species of this American genus very much resemble those of the genus *Penthimia* they certainly pertain to the family Cercopidæ and not to that of Tettigoniidæ in which they are placed by Mr. Walker.

193. BUTTERNUT TINGIS, *Tingis Jugianais*, new species. (Hemiptera. Tingidæ.)

Puncturing the leaves and sucking their juices, a small singular bug resembling a flake of white froth, its whole upper surface composed of a net-work of small cells, an inflated egg-shaped protuberance like a little bladder on the top of the thorax and head, the sides of the thorax and of the wing covers except at their tips ciliated with minute spines, the wing covers flat and square with their corners rounded, a large brown or blackish spot on the shoulder and a broad band of the same color on their tips with an irregular whitish hyaline spot on the inner hind corner; the body beneath small and black, the antennæ and legs honey-yellow. Length 0.14.

This insect becomes common on the leaves of the butternut in May and continues through the summer and autumn. It may sometimes be met with also on birch, on willows, and other trees. It corresponds with the *arcuata* of Say (Heteropterous Hemiptera, p. 27) in every respect, except that the outer margin of the wing covers is rectilinear and not arcuated or concavely excavated, and their veins are not ciliated with minute erect spines. I have never met with the *arcuata* in the state of New-York, but have gathered it from bushes in the outskirts of the city of Chicago.

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Both species are very similar to the *Tingis rhomboptera* described in Fieber's excellent monograph of this family, and figured, plate 8 fig. 37, but that has a spot on the middle of the outer margin of the wing covers and their tips much less discolored with brown than in our insects.

194. BUTTERNUT WOOLY-WORM, *Selandria? Juglandis*, new species. (Hymenoptera. Tenthredinidæ.)

A worm remarkable for being enveloped and wholly hid in a thick coating of snow-white flocculent meal which falls off with the slightest touch, resides in companies on the under sides of the leaves, feeding upon them, in the month of July. It is of a cylindrical form, a very little tapering from its head to its tip, and has ten pairs of dull pale yellow feet, its body being of a blackish color and its head pale yellow and polished, with a large black dot upon each side. It has numerous transverse impressed lines and a groove on the middle of its back its whole length. The individuals I have examined were nearly half an inch in length. My attempts to rear them have proved unsuccessful. In one instance the leaf on which they were found was pinned to a leaf of a butternut growing in my yard, without disturbing them, but they refused to move from their original abode and perished as the leaf withered. They are evidently a species of saw-fly, pertaining there is scarcely a doubt to the genus *Selandria* and the sub-genus *Eriocampa*, thus named from its larvæ being covered with pruinose woolly matter.

The HICKORY TUSsock-MOTH No. 183, occurs about as frequently on the butternut as on the walnut, and two other caterpillars belonging to the same genus but which are not yet known to us in their perfect state are also common upon this tree. Other caterpillars and worms which have been observed feeding upon the leaves of the butternut are the larvæ of

The WHITE MILLER No. 125;

The FALL WEB-WORM No. 88;

The CECROPIA EMPEROR MOTH No. 33;

The POLYPHEMUS MOTH No. 181; and

The BLACK-WALNUT SPHINX No. 186.

15. THE CHESTNUT.—*Castanea vesca*.

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We have never noticed any boring insect of a large size in the wood of this tree. But the durability of its timber, which is so highly valued, particularly for fence rails and posts, is much impaired by small insects which perforate it with holes that are only of sufficient size to admit the head of a pin, but which are often excessively numerous, and being pierced directly inward towards the heart of the tree become filled with wet from every shower. The decay of the wood is hereby greatly accelerated. These perforations are made by a slender cylindrical six-footed worm, half an inch long, of a white color and brownish yellow at each end, its apex cut off abruptly and obliquely and edged with small black teeth. The beetle that is produced from this worm is not yet ascertained.

Rails which have been pierced with pin-holes by this insect should always be placed in the fence with their sap side downwards, as it is upon this side that these holes mostly open.

195. TWO-TOOTHED SILVANUS, *Silvanus bidentatus*, Fab. (Coleoptera. Mycetophagidæ.)

Under the bark of logs and decaying trees, probably loosening the bark from the wood, a minute, narrow, flattened beetle, of a light chestnut-brown or rust-color, its thorax longer than wide, slightly narrowed towards its base and with a small tooth projecting outwards at each of its anterior angles. Length 0.10 to 0.12.

This is a European insect, which, like a kindred species, the Surinam Silvanus, has now become perfectly naturalized and as common throughout the United States as it is in its native haunts. On stripping the bark from recently cut logs of chestnut and of oak, this minute beetle, which is so flattened and thin that it can creep into the slightest crevices, will be found frequently in considerable numbers. We have several other insects which inhabit similar situations and are so much like this that a careful examination is requisite to determine their respective species. By the

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characters which are subjoined, in addition to those above stated, the Two-toothed Silvanus may be recognized.

Its head and thorax are often of a darker shade than its wing covers, especially in the moist living specimen. Its wing covers have rows of close punctures with a slightly elevated line between each alternate row. Its thorax also is densely and confluent punctured, and commonly shows a very faint elevated longitudinal line in its centre. The angles at its base on each side are obtuse, and from these angles forward to the projecting tooth the lateral edges are crenate-dentate, having sixteen little elevated tubercles or minute teeth jutting out at equal distances along the margin. The point of the large anterior tooth forms a right angle. Upon each side of the head behind the eye is also a minute tooth of the same size with those along the sides of the thorax. The surface is slightly clothed with minute inclined bristles.

In every group of these insects individuals will probably be found of the following varieties:—

a. bisulcatus. The basal part of the thorax with two shallow grooves. The few specimens which I have received from the south are all of this variety and have the grooves deeper and more distinct than they are in any of my New-York specimens. Erickson supposes this variety to be the *Colydium sulcatum* of Fabricius, but this can scarcely be, since Fabricius characterizes that species as having the wing covers smooth and makes no allusion to any projecting teeth upon its thorax.

b. carinatus. A distinct elevated line upon the middle of the thorax its whole length.

c. planus. Thorax wholly destitute of a longitudinal line on its middle.

196. AMERICAN WHITE ANT, *Termes frontalis*, Haldeman. (Neuroptera. Termitidæ.)

Myriads of white ants mining in and wholly consuming the interior of fence posts and stakes whilst the outer surface remains entire.

This insect has received its scientific name in allusion, I suppose, to the deep notch which occurs in front upon the heads of the soldiers, but as many other species are notched in the same manner, I think the common name which I give it will be its most appropriate designation, since it is common all over our country, and is the only species of white ant which we have in the United States. The workers or larvæ which form much the most numerous portion of each colony of these insects, are 0.18 to 0.20 long, white and glossy, with pale brownish abdomens irregularly clouded with white. Winged individuals, supposed to be the males, make their appearance in the month of May.

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They are of the same size with the preceding but are of a glossy black color, with the mouth, shanks, feet and tip of the abdomen pale yellow, and with four large wings which are twice as long as the body, and hyaline but not clear like glass. About the beginning of June, during the dampness of the mornings preceding pleasant days, these winged white ants leave their retreats and come abroad, and the air is everywhere filled with countless millions of them. The soldiers resemble the workers, but are 0.25 long with enormously large heads twice as long as wide and their opposite sides parallel, with stout jaws half as long as the head and of a blackish chestnut color.

Decaying stumps and logs lying upon the ground, especially those of pine and other soft wood, are everywhere occupied by these insects. The cavities which they excavate become thronged with myriads of them. Fortunately for us it is only soft damp wood in which they work; hence the dry timbers and furniture of our dwellings are exempt from that havoc which some of these insects occasion in tropical countries. But the posts and stakes of our fences furnish a congenial resort for them, that portion which is under ground being always sufficiently damp to answer their requirements. Posts in particular from which the bark has not been removed, whereby these creatures can remain hid from view whilst they consume the soft sap wood immediately under the bark, are a favorite abode for them. And as the sap wood becomes destroyed they extend their burrows through the more solid heart wood. I have seen a fence four years after it was built, every post of which was reduced to a mere shell by these insects, though externally there was not the slightest indication of the mischief that was going on within.

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197. CHESTNUT TREE-HOPPER, *Smilia Castaneæ*, Fitch. (Homoptera Membracidæ.)

Puncturing the leaves and extracting their juices, a triangular tree-hopper shaped much like a beechnut, of a blackish color, tinged with green more or less when alive, its head and the anterior edges of its thorax and all beneath bright yellow, its fore

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wings clear and glassy with a blackish spot on their tips and another on the base which is often prolonged along the middle of the wing and united with the hind spot. Length of the male 0.25, female 0.30. This is a common insect on chestnut leaves in the month of July, and I have never met with it upon any other vegetation.

198. UNADORNED TREE-HOPPER, *Smilia inornata*, Say.

A tree-hopper of the same size and shape with the preceding, but of a light green color fading to light yellow, with a slender black line along the upper edge of its back and a very slight duskiness on the tips of its glassy wings. This is quite common on the chestnut and on oaks from the beginning of July till the last of September.

The UNARMED TREE-HOPPER No. 64, is also met with on the chestnut in May and July, and at first sight appears identical with the preceding species. It may be distinguished from it by the hind end of its thorax, which is drawn out into a slender, sharp point, and its breast, which is black.

199. CHESTNUT GAY-LOUSE, *Callipterus Castaneæ*, new species. (Homoptera. Aphidæ.)

On the under sides of the leaves, puncturing them and sucking their juices in August and September, a small sulphur-yellow plant-louse, with black shanks and feet, its antennæ also black except at their bases and as long as the body, its wings pellucid, their first and second oblique veins and the tip of the rib-vein edged with coal-black, and its thighs straw-yellow. Length 0.09, to the tip of the wings 0.15.

This insect, in company with wingless larvæ and pupæ of the same color, may frequently be met with upon the under sides of chestnut leaves. The name "gay-louse," which is of the same import with the generic term *Callipterus*, and is the equivalent of the German name *zierlaus* which Koch applies to these plant lice, will be the most appropriate designation which our language furnishes for this and the other species of this genus, several of which have already been noticed in the preceding pages, (No. 20, 167-171.) Their bright, lively colors, and their long, slender

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antennæ and legs render them the prettiest objects belonging to the aphid family.

203. CHESTNUT LEAF-WITHERER, *Phylloxera? Castaneæ*, Haldeman. (Homoptera. Aphidæ.)

In August and September, on both sides of the leaves, puncturing them and extracting their juices and causing them to curl, a very small louse-like fly of a bright sulphur-yellow color with a black thorax, breast and eyes, its feet and antennæ tinged with blackish and its wings translucent. The wingless individuals associated with it are entirely yellow with red eyes.

I have never met with this species. The veins or nerves of the wings are described as follows: "First and third transverse nervures normal; second arising from the middle of the first and terminating in the normal position; posterior wings without nervures." From this description the veins appear to be essentially different from those of the genus *Chermes*, to which Prof. Haldeman refers this species. And I cannot but think that more exact observations will detect a rib-vein in the hind wings, and will show that this insect pertains to the genus *Phylloxera*.

The larva of the AMERICAN MAPLE MOTH (*Apatele Americana*, Harris), a large thick-bodied caterpillar two inches long and of a pale yellow color with two black pencils above on the fourth and sixth rings and a single one near its tip, feeds upon the leaves in August, but is much more common on the maple, under which head it will be described.

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One would suppose that the fruit of the chestnut, wholly inclosed as it is in a thick leathery bur, the surface of which is crowded with prickles with their needle-like tips pointing in every direction, was so effectually protected that no depredator could possibly reach it, or if attacked, we should think it could only be by some small insect panoplied like the rhinoceros, its hard shelly coat enabling it to encounter these prickles without harm. It is most wonderful, therefore, to discover that a little insect with a soft tender body, has the artifice of inserting its eggs

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at a particular point in the tip of this ball-like bur, where its young can penetrate inwards and subsist upon the fruit.

Dr. Harris (Treatise, p. 65,) speaks of a "weevil grub" as being very common in the chestnuts of this country. But the worm which I have met with in these nuts is the larva of a moth and not of a weevil. It grows to more than a half inch in length, and is cylindrical and thick, of a dirty white color with a tawny yellow head, and sixteen feet. It eats the meat of the nut mostly at its tip and on its convex side, the cavity which it makes being filled with little brown and whitish grains; and a small hole is perforated upon one side of the nut at its tip, out of which a portion of these grains are protruded. I have not yet succeeded in rearing this worm, and am therefore unable to give a description of the moth which is the source of this mischief.

16. THE HAZELNUT—*Corylus Americana*.

AFFECTING THE STALKS.

201. HAZELNUT BARK-LOUSE, *Lecanium Corylifex*, new species. (Homoptera. Coccidæ.)

On the under side of the stalks and branches, adhering to the bark, a smooth shining hemispheric scale of various colors, from pale dull yellow and deep tawny red to black, many individuals showing a paler stripe along the middle and others with transverse black bands, the surface often sprinkled over with projecting scales of a white wax-like substance. This is commonly small in size, being but about 0.14 in length, but some specimens are larger, measuring 0.20. A similar insect is common upon the European hazelnut, but is said to be of an orange-yellow color with red spots; I therefore infer it to be a different species.

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202. HAZELNUT TREE-HOPPER, *Talmona Coryli*, Fitch. (Homoptera. Membracidæ.)

Puncturing the leaves and sucking their juices the latter part of June, a triangular tree-hopper of a pale dull yellow color with

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a hump upon the middle of its back of the same shape as in the following species, with a rust-colored band occupying the anterior end of this hump and a curved one margined with black crossing its posterior end, the hind end of the thorax being also rust-colored, and the tips of the fore wings with oval blackish spots in the intervals between the ends of the veins. Length 0.32. Rare.

203. SAD TREE-HOPPER, *Telamona tristis*, Fitch.

Extracting the juices of the leaves and succulent twigs in August, a tree-hopper of the same shape with the foregoing but of a much darker dull yellow or blackish color sprinkled over with pale dots and without any transverse bands; the elevated hump upon the middle of the back almost as high posteriorly as at its forward end, its upper edge straight and at the anterior end abruptly rounded, its hind end forming almost a right angle and its posterior base deeply excavated and forming the third part of a regular circle; an elevated polished black line along the middle of the thorax its whole length, with a few pale alternations, and widely interrupted with white in the excavation at the posterior base of the hump; one or two small hyaline spots in the upper edge of the hump; three black dots above each eye; a black spot on the tip of the wings; under side pale dull yellow. Length 0.35.

The OBTUSE CLASTOPTERA No. 192, and the BOUND TREE BUG No. 100, also occur on the hazelnut, and its leaves are sometimes consumed by a large pale green worm, the larva of the LUNA MOTHS No. 180.

204. ELONGATED FORKED-CLAW, *Dichelonycha elongatula*, Gyllenhal. (Coleoptera. Melolonthidæ.)

Eating the leaves the latter part of May and in June, a narrowish cylindrical black beetle margined with chestnut brown, its wing covers shining yellowish-green margined with pale yellow, its under side pale yellow covered with short white incumbent hairs, and its legs pale yellow with the hind shanks except at their bases and the hind feet blackish. Length 0.33.

This is a common insect, usually found upon hazelnut bushes. It was first described by Fabricius in the year 1791, under the

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name *Melolontha elongata*, but Olivier had previously given this same name to a much larger South American beetle. It therefore became necessary to re-name this species, and we accordingly in the next record that is made of it (Schonherr's Syn. iii, 210), find the Fabrician epithet changed to *elongatula*. Thus the latter comes to be the legitimate name of this insect. Dr. Le Conte appears to have overlooked these facts and goes back again to the Fabrician name. In Dr. F. E. Melsheimer's Catalogue the genus *Dychelonycha* is credited to Dr. Harris. Dr. H. originally proposed the name *Dichelonyx* for this genus, but gave no description of it; and it is therefore to Mr. Kirby that we are indebted for this name and genus as it at present stands.

205. LINEAR FORKED-CLAW, *Dychelonycha linearis*, Gyll.

In company with the preceding, a beetle closely resembling it but slightly larger and having its thorax covered with short prostrate yellow hairs.

206. BACK'S FORKED-CLAW, *Dichelonycha Backii*, Kirby.

Occasionally found in company with the preceding, a beetle differing from it by having its antennæ and forward thighs blackish instead of pale yellow.

207. GREEN-STRIPED FORKED-CLAW, *Dichelonycha subvittata*, Leconte.

Associated with the foregoing, a beetle resembling the elongated forked-claw, but having a shining deep green spot on the shoulder and another on the tip of each wing cover, these spots sometimes connected by a green stripe on the middle of the wing cover its whole length, and its hind shanks and feet not discolored with blackish. Dr. Le Conte credits this species to Lake Superior, but it is common also through Northern New-York and Vermont.

208. HAIRY ATTELABUS, *Attelabus pubescens*, Say. (Colcoptera. Attelabidæ.)

Eating holes in the leaves in June and July, a short thick-bodied dull red or yellow weevil, its surface covered with short pale yellow prostrate hairs which are often rubbed off in places, and its breast black. Length about 0.20.

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Mr. Say described this species in the year 1826, and it is probably since that date that Prof. Bohemann's name *Rhois* was published, which name moreover is inappropriate, as it indicates this insect to inhabit the sumach, whereas it is upon the hazelnut that it is uniformly met with. It is a common species, and sits upon the leaves in the posture of a dog, with its long fore legs braced outwards and elevating its head high above its body. Its larva probably subsists upon this shrub, but its habits are as yet unknown to us.

AFFECTING THE FRUIT.

209. STRAIGHT-BEAKED NUT-WEEVIL, *Balaninus rectus*, Say. (Coleoptera. Curculionidæ.)

A small yellowish drab-colored weevil with a long slender beak not thicker than a bristle and having the jaws placed at its tip with which it bores a hole into the nut when it is young and soft, and drops therein an egg which it crowds into the nut with its beak. A small white footless worm hatches from this egg, which feeds upon the meat of the nut and gnaws a small hole through its side, out of which when full grown it escapes and buries itself in the earth to pass its pupa state.

We are not certain as to the species of weevils which produce the grubs in our American hazelnuts, walnuts and acorns. As the Straight-beaked weevil has a long slender beak similar to that of the species which breeds in the hazelnuts in Europe, and as I have met with numbers of this insect upon hazelnut bushes the latter part of June, there can be little doubt but it was there for the purpose of depositing its eggs in the young fruit. Dr. Harris records the Long-beaked nut-weevil No. 185, as occurring also upon hazelnut bushes, and it may be that both these insects infest this fruit. They are much like each other, differing chiefly in their beaks, which in the present species is but half the length of the body and usually straight nearly to its tip, where it is curved downwards, but in some individuals it is slightly curved through its whole length, and is of a pitchy black color tinged in its middle with chestnut-brown. Its body is clothed with prostrate drab-yellowish hairs on a blackish rust-colored ground. These

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hairs often form a faint stripe on each side of the thorax, which also shows an obtuse elevated line on its middle. Its scutel is oval and ash-gray. Its wing covers have punctured impressed lines, and the hairs being rubbed off in places, irregular spots of a rusty color are produced. The under side is clothed with short prostrate ash-gray hairs, which are less dense upon the chestnut-brown legs. It measures 0.30 in length, exclusive of its beak.

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As stated in the introduction to the present Report, a few pages are here devoted to some of those insects which have come under my observation, which do not pertain to the noxious class but are yet too interesting on various accounts to be withheld from the public. The limits, however, to which I find myself restricted oblige me to omit several species which I had purposed noticing.

210. EMASCULATING BOT-FLY, *Cuterebra emasculator*, new species. (Diptera. Estridæ.)

The history of this remarkable insect will be best presented by extracting from my manuscript notes the successive memoranda therein entered relating to this subject.

August 13th, 1856. Peter Reid of Lakeville informs me that his cat yesterday brought into the house a striped squirrel (*Sciurus striatus*.) On taking it into his hands he noticed its scrotum was enormously swollen and hard, with an orifice in it about the size of a wheat straw, and on pressing it with his fingers he could distinctly feel the writhings of something alive in this tumor. On enlarging this orifice with the point of a pen knife he discovered it was a large grub lying with its tail to the opening. It discharged at intervals three large drops of a fluid resembling grumous blood mixed with purulent matter. On pressing upon it so as to protrude the tail end of its body slightly out of the opening it exerted itself to crawl out, forcing its fluids into the part which was out of the orifice so that it became swollen and hard, and then regurgitating them into the body again, whereby the extruded portion became soft and collapsed, thus pressing upon and dilating the orifice, so that with three or four repetitions of

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this motion it worked itself out and dropped upon the floor. It proved to be a very large soft blackish grub with numerous paler spots. It was about an inch long and half as broad, oval, slightly depressed, divided into segments, with its surface covered with small, shining elevations resembling the granular surface of morocco leather. It had no feet or jaws that he could perceive. On showing him the figure of the larva of *Æstrus Bovis* in Westwood's Introduction, vol. ii, page 580, fig. 1, he recognizes a resemblance to that altogether more than to any of the other larvæ figured in that part of the volume. It seemed from its motions to be a formidable, ferocious creature. He put some damp chip dirt into a tin box and placed it thereon, it having been exposed to the air only about four minutes. It immediately worked its head down into the dirt and soon buried itself, evidently understanding what it was about. Mr. Reid brings this box and the squirrel to me. I sink the box in a flower bed in my yard and invert a glass tumbler over it. On examining the squirrel I find the fleshy glandular tissue of the testicles wholly consumed, nothing of them remaining but their empty outer skin. Mr. Reid says the fact is well known to hunters, that of the grey and other squirrels killed in this vicinity, at least one half of the males are castrated. It is the current opinion with them that this deformity is caused by the squirrels' seizing and biting out the testicles of their comrades, some of them strenuously maintaining that they have seen these animals engaged in this act. There are some hunters, however, that say they have found two grubs in the scrotum of some squirrels, and they conjecture that it is by these that the testicles are destroyed.

August 22, 1856. Mr. Hurst, Taxidermist of the State Cabinet of Natural History, informs me that on one occasion he saw a half dozen red squirrels (*Sciurus Hudsonius*) unite in mastering a gray one (*S. Caroliniensis*) and castrating him. He had so fair and distinct a view that there could be no mistake as to the fact, his eyes witnessing the very work in which the animals were engaged. *Query.* May it not be a flesh-fly which drops its egg into the wound of the castrated squirrel, from which grows the grub which Mr. Reid brought me?

September 1st, 1856. Mr. Reid brings me a striped squirrel

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with two grubs in its scrotum, considerably torn and injured by the coarse shot with which it was killed. These grubs are plainly the larva of a bot-fly and not of a flesh-fly. They are placed lengthwise in the scrotum, one forward of the other, producing a tumor nearly an inch and a half in length. Each worm has a cavity for itself, separated from the other, with an orifice towards its hind part, larger than the head of a large pin. Though the worms are probably immature the testicles appear to be entirely consumed, but the parts are so torn that I do not attempt to trace out the exact lesion which they have produced.

Of these two LARVÆ that which is least injured is 0.65 long and 0.44 broad. The other is smaller, being only 0.32 broad. They are oval, moderately depressed, more flattened beneath than above, rounded at one end and somewhat pointed at the other, of a coal black color and shining, the whole outer surface being covered with slightly elevated small hard angular granules, like shagreen, but without any projecting spines or teeth-like processes. The skin is remarkably thick and tough like leather, and the rough angular points with which it is covered must produce much irritation in the tumor, especially when the worm moves. It is divided into ten segments by deeply impressed transverse furrows, each segment forming a prominent ridge which is most elevated towards its hind edge. Towards the outer side each ridge is cut across by a conspicuously impressed longitudinal line, giving the worm a three-lobed appearance similar to that of a trilobite fossil. On the under side is an analogous impressed line, and between these at equal distances along each side are two others less deeply indented. The mouth does not show any jaws or other appendages externally but appears like a simple elliptic orifice placed transversely; and the perforation at the opposite end is similar. The specimens, however, are so mutilated that they do not afford a satisfactory examination. The worm is much like the figure in Westwood above referred to.

July 29th, 1857. I have repeatedly raised the tumbler to see if the worm buried last August had hatched, and began to despair of obtaining anything from it, when to-day, to my great joy, I find a large fly lying upon its back, dead, upon the surface of the dirt in the tin box, with the ends of its wings worn off from flying in its narrow prison, but perfect in every other respect. It proves to be of the bot-fly family (*Æstridæ*) and of the genus *Cuterebra* of Clark, thus named from two Latin words, *cutis terebra*, i. e. skin borer or skin piercer, this genus being distinguished by having the bristle of the antennæ feather-like or ciliated with a row of fine hairs along each side, and showing a distinct orifice

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at the mouth—several of the bot-flies being destitute of any opening at the mouth and taking no nourishment after they reach their perfect state. Nine species have been described by different authors as pertaining to this genus, all of them belonging to America save one which occurs in India. Nothing, however, appears to be known of the habits of the flies of this genus, except that the larvæ of two of them, which are found in the state of Georgia, reside under the skin of the rabbit. And this species appears to be different from any of those heretofore described. It is a large thick-bodied fly nearly three-fourths of an inch long, its head, thorax and abdomen of the same width, with the abdomen but little longer than wide and its smoky brown wings of about the same length with the abdomen and held together flat upon it. Its thorax is covered with whitish hairs which are more dense upon the sides, where is a large black dot. Its face is white with a large black dot upon each cheek, and the last segment of its abdomen is clothed with whitish hairs.

The dirt in the box had a depth of about two inches and the worm had penetrated to its bottom and there changed to a pupa, its outer skin becoming dry and hard and forming the outer covering or pupa-case of the insect.

This PUPARIUM is 0.80 long and 0.40 broad, nearly cylindrical, though flattened anteriorly in the region of the breast, and rounded at both ends. It is of a tough crustaceous substance, as thick and hard as the shell of a chestnut, and its whole surface is rough like shagreen, being crowded with elevated black shining points, to which a coating of dirt adheres as though it were glued thereto. It does not show any elevated transverse ridges, like those upon the larva, but six impressed lines or sutures are very perceptible, dividing it into seven segments which are mostly of equal length. The anterior one of these segments breaks off obliquely at its suture, to enable the fly to escape, the piece thus separated being a large roundish or egg-shaped scale, more broad than long, being 0.30 broad, and this scale shows upon its inner surface two curved elevated lines, which are sutures dividing it into three segments of nearly equal length; and at its anterior end is a small fourth segment marked by a strong depression in the surface. We thus find a total of ten segments in the pupa-case, the same number which we saw in the larva, those representing the head and thorax being much changed and soldered together into a single flattish piece instead of the circular rings which they formed in the larva. The small anterior segment has a wide shallow notch on its forward edge, on each side of which, exteriorly, is a round tuft or button composed of a mass

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of short pale yellow hairs evenly shorn at their tips and projecting out from the surface, and opposite these tufts on the inner surface is a small round spot of the same yellow color, formed of exceedingly fine lines radiating from the centre to the outer margin of the spot, which is bounded by an elevated ring or hoop which is also of a pale yellow color. From this description the entomologist will perceive that the pupa-case of this fly is analogous in almost every particular with those of many other insects of this order.

The *FLY* is a female and measures 0.70 in length to the tip of its abdomen and wings. Its *head* is black above, with close fine punctures, and is densely covered with short erect black hairs; its under side is brownish flesh-colored, closely punctured and clothed with white hairs which incline inward towards the mouth. Upon each cheek, below the eye and adjacent to the outer edge of its orbit, is a large shining black dot, in which the punctures are coarser and more distant from each other, and the space between this and the eye is darker brown. The antennæ are dark liver-brown and have a few whitish hairs overlying their bases, like eye-lashes. Their bristle is black at its base and the fine hairs with which it is ciliated are whitish. The cavity in which the antennæ repose has an ash-gray reflection, and on each side between this cavity and the eye is an elevated smooth shining space which is coarsely punctured. The *thorax* is black, finely punctured and clothed with soft hairs which incline backwards and appear of a tawny brown color when viewed from above but when seen from the side are white slightly tinged with yellow. Upon each side these hairs are much more dense, and half way from the wing-socket to the lower edge of the eye is a dot formed of black hairs. The scutellum is black and clothed with black hairs. Beneath it on each side is a small yellowish-white dot, from which a short white line extends outwards. The *abdomen* is black, shining, densely punctured and covered with fine short hairs which incline backwards, those at the base being longer and those on the last segment tawny yellowish-white when viewed laterally but appearing black when seen from above. The segments are prolonged to the under side of the body, where their ends are of a glaucous grayish color with a large black dot upon each. The *legs* are black and covered with short black hairs, those towards the tip of the forward thighs on the hind side being yellowish white. The *wings* are smoky brown and imperfectly hyaline. At the base on their inner side is a large lobe of a square form with its corners rounded and its inner edge slightly concave. The winglets are blackish and opaque with a narrow chestnut-brown margin.

A specimen of this same insect, sent me from west of Arkansas by William S. Robertson, varies in having the hairs upon the last segment of the abdomen much more dense, causing this segment to appear of a yellowish-white color, and the ends of the other segments are but obscurely tinged with gray without any black dot.

From what has now been stated I think that every one will agree with me in the opinion that it is by this fly that the squirrels in our country are emasculated, and that this remarkable

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fact in our Natural History which has hitherto been involved so deeply in doubt is hereby satisfactorily elucidated. But what are we then to think of the statement of Mr. Hurst, above related, and much other testimony of the same purport. The act which these persons aver that they have witnessed is so unnatural and so much at variance with everything which has been observed elsewhere in the domain of nature, that no scientific writer, that I am aware, has given any credit to these statements. Yet the testimony appears to be too explicit and positive to be wholly rejected. I am therefore led to believe that these animals do attack each other in the manner that has been stated; not, however, for the purpose of emasculating their comrades, as has been supposed, but for the purpose of coming at and destroying these bot-grubs, the enemies of their race. We know the terror which some of these bot-flies give to the animals on which they are parasites, and the efforts which such animals make to escape from them. The squirrel also is undoubtedly conscious that this insect is his greatest foe; he probably has sufficient intelligence to be aware that from the grub which is this year tormenting one of his unfortunate comrades, will come a descendant which next year may afflict him or some of his progeny in the same frightful manner. Hence his avidity to destroy the wretch and thus avert the impending calamity. Future observations must determine whether this conjecture is correct. We fervently hope that the sportsman or other person who next witnesses a squirrel overpowered by its fellows in the manner stated, will kill that squirrel and let the world know whether he does or does not find in it one of these grubs. If a grub is discovered, no doubt can remain as to the object of the other squirrels in making the attack which they do.

The fact has repeatedly been noticed of the squirrels in our country, that they sometimes become excessively numerous throughout a particular district, doing much injury to the corn and other crops of the farmer, both in the field and in the barn, and that they then suddenly disappear, so that scarcely one of these animals is anywhere seen. Writers on our Natural History adverting to this fact, say that their food becoming exhausted in the section of country where they are thus numerous, they migrate to

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other districts. But it now becomes altogether more probable that this sudden thinning in the ranks of these creatures is caused, not by their migration, but by their increase being suddenly arrested by this insect. Recently the field mice have been very abundant all over our country, and complaints were everywhere made of apple and other trees being girdled and destroyed by them in the winter of 1855-'56. The same causes which produced such unusual numbers of these vermin appear to have favored the increase of other small animals also. In my own vicinity at least, the squirrels, having been quite plenty in the preceding years, became unusually numerous last year, and from the readiness with which individuals containing parasites were then obtained, it is evident that the males were generally infested with these insects. The present year, sportsmen inform me there is a remarkable paucity in the numbers of these animals, not a quarter as many being now present in the forests as were found there a year ago. This diminution it can scarcely be doubted, has been occasioned by the insect of which we are treating. And whenever the squirrels are becoming multiplied these parasites will rapidly increase their numbers also. We know what a multitude of eggs a single bot-fly glues to the hairs of a horse's fore legs. If this squirrel-fly is similarly prolific what a host of these unfortunate animals will a single female mutilate, since she places only one or two eggs in each! By some mysterious instinct she undoubtedly knows whether a squirrel is already inoculated, and thus avoids consigning a single one of her progeny where it will be forestalled and unable to obtain the amount of nourishment which it requires. Hence, when the numbers of these insects become but moderately increased, as each female will be intently on the alert to dispose of her stock of eggs, it will scarcely be possible for a male squirrel anywhere to escape them.

Emasculated individuals are met with belonging to each of the species of squirrel common in our country. It is a fly bred from the striped squirrel which I have described above. Whether this same fly attacks our other squirrels also, or whether each kind of squirrel has a distinct species of bot-fly peculiar to it, future observers must determine. As there are two species of these insects residing under the skin of our American rabbits it is quite

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probable there may be more than one species producing this mutilation in our squirrels.

211. LINTNER'S BUTTERFLY, *Vanessa Lintnerii*, new species. (Lepidoptera. Nymphalidæ.)

To discover a new species of butterfly of a large size, in the State of New York, at this day, is quite an achievement, as these insects are such ornaments to collections that they have been sought after with the greatest avidity, and next to the beetles, our larger Lepidoptera have been more fully investigated and are better known than the insects of any other order. The honor of such a discovery belongs to I. A. Lintner, Esq., of Schoharie, a gentleman who takes much interest in the insects of this order, and has communicated to me several valuable facts relating to those which inhabit the section of our State where he resides.

This butterfly is closely related to the Antiopa or White-bordered butterfly, a species which is common upon both sides of the Atlantic. Its wings have perfectly the same form and are similarly colored to those of the Antiopa, but their pale border is twice as broad as in that species, occupying a third of the length of the wings, and it is wholly destitute of the row of blue spots which occur in Antiopa forward of the border. Its ground color is deep rusty brown, much more tinged with liver-reddish than in Antiopa. The fore margin of the anterior wings is black freckled with small transverse white streaks and lines, but is destitute of the two white spots which are seen in Antiopa. The broad outer border is of a tarnished pale ochre-yellow hue, speckled with black the same as in Antiopa, and becomes quite narrow at the inner angle of the hind pair. The wings beneath are similar to those of Antiopa, but are darker and without any sprinkling of ash-gray scales or any whitish crescent in the middle of the hind pair, and the border is speckled with gray and whitish in wavy transverse streaks, without forming the distinct band which is seen in Antiopa. Any further description is unnecessary. A variety of the Antiopa has sometimes been met with in Europe, in which the blue spots are wholly wanting, and individuals occur in this country in which these spots are faint and some of them obliterated. But this butterfly differs from the Antiopa so decidedly in several other characters as to forbid our regarding it as a variety of that species. Its width across the spread wings is 2.75. It was captured in a grove of willows according to Mr. Lintner's recollection.

212. IRENE BUTTERFLY, *Nathalis Irene*, new species. (Lepidoptera. Papilionidæ.)

A small yellow butterfly inhabiting Mexico closely resembles those belonging to the genus *Terias*, but differs generically in having the feelers standing apart from each other, and long and

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bristly, as they are in the genus *Pieris*. It forms the type of a distinct genus, named *Nathalis* by Boisduval, this species being designated *Iole*. A similar butterfly occurs in the valley of the Mississippi, which, from a specimen received from W. S. Robertson, appears to be a distinct species, differing from that of Mexico in having the under side of the fore wings destitute of a blackish central dot, and of the three blackish spots towards their inner angle the hindmost one is here prolonged into a broad stripe extending to the base of the wing and slightly separated from its inner edge; and the base of the wing instead of its outer margin is orange yellow. I therefore propose for this insect the above name. It is but an inch in width across its spread wings.

213. THREE-COLORED LITHOSIA, *Atolmis tricolor*, new species. (Lepidoptera. Lithosiidæ.)

The Vermillion-striped Lithosia, *L. miniata*, Kirby, which is the same insect with the *Gnophria vittata*, Harris, I have met with in New-York only upon the Highlands of the Hudson. A similar moth, but much less bright in its colors, is commonly confounded with that species, from which it differs in having a large lead-colored spot on the centre of its thorax, the head and also the outer margin of the fore wings, their apical edge, their inner margin and the basal half of the stripe on their middle being nankin yellow instead of bright vermillion red, and the hind wings are lead-colored on their outer margin nearly or quite to the base. This is not rare in Washington county, and has been sent me from Schoharie by Mr. Lintner, and from Northern Pennsylvania by Dr. G. F. Horton. Its larva feeds upon the lichens or moss growing on the trunks of trees, the moth coming out in July.

214. GOLDEN LITHOSIA, *Deiopeia aurea*, new species. (Lepidoptera. Lithosiidæ.)

A truly elegant little Lithosia, sent me from Savannah, Georgia, by Mrs. Wm. G. Dickson, has the fore wings bright marigold-yellow with four bands of round pale sulphur-yellow spots upon a brilliant steel-blue ground, the hindmost band almost upon the apex, its outer half abruptly widened and slightly united with the third band, which is the broadest, and towards its outer end is abruptly narrowed and almost interrupted. Its hind wings are